

170i

# TRANSARC WELDING INVERTER



A-11711

## Operating Manual

Revision: AA  
Operating Features:

Issue Date: January 10, 2013

Manual No.: 0-5281



|          |     |      |      |            |    |    |          |            |     |
|----------|-----|------|------|------------|----|----|----------|------------|-----|
| INVERTER | VRD | GTAW | MMAW | 170<br>AMP | CC | DC | 240<br>V | 1<br>PHASE | PFC |
|----------|-----|------|------|------------|----|----|----------|------------|-----|



## **WE APPRECIATE YOUR BUSINESS!**

Congratulations on your new Cigweld product. We are proud to have you as our customer and will strive to provide you with the best service and reliability in the industry. This product is backed by our extensive warranty and world-wide service network. To locate your nearest distributor or service provider call +1300 654 674, or visit us on the web at **[www.cigweld.com.au](http://www.cigweld.com.au)**

This Operating Manual has been designed to instruct you on the correct use and operation of your CIGWELD product. Your satisfaction with this product and its safe operation is our ultimate concern. Therefore please take the time to read the entire manual, especially the Safety Precautions. They will help you to avoid potential hazards that may exist when working with this product.

## **YOU ARE IN GOOD COMPANY!**

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CIGWELD is the Market Leading Brand of Arc Welding Products for Victor Technologies International. We are a mainline supplier to major welding industry sectors in the Asia Pacific and emerging global markets including; Manufacturing, Construction, Mining, Automotive, Engineering, Rural and DIY.

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Above all, we are committed to develop technologically advanced products to achieve a safer working environment for industry operators.



## **WARNINGS**

*Read and understand this entire Manual and your employer's safety practices before installing, operating, or servicing the equipment.*

*While the information contained in this Manual represents the Manufacturer's best judgement, the Manufacturer assumes no liability for its use.*

Operating Manual Number 0-5281 for:

Cigweld Transarc 170i Inverter Plant

Part Number W1007170

Cigweld Transarc 170i Mine Spec Inverter Plant

Part Number W1007171

Cigweld Transarc 170i Mine Spec Power Source (packed) Part Number W1007169

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Publication Date: January 10, 2013

### **Record the following information for Warranty purposes:**

Where Purchased:

\_\_\_\_\_

Purchase Date:

\_\_\_\_\_

Equipment Serial #:

\_\_\_\_\_

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## SECTION 1:

# ARC WELDING SAFETY INSTRUCTIONS AND WARNINGS



### WARNING

**PROTECT YOURSELF AND OTHERS FROM POSSIBLE SERIOUS INJURY OR DEATH. KEEP CHILDREN AWAY. PACEMAKER WEARERS KEEP AWAY UNTIL CONSULTING YOUR DOCTOR. DO NOT LOSE THESE INSTRUCTIONS. READ OPERATING/INSTRUCTION MANUAL BEFORE INSTALLING, OPERATING OR SERVICING THIS EQUIPMENT.**

Welding products and welding processes can cause serious injury or death, or damage to other equipment or property, if the operator does not strictly observe all safety rules and take precautionary actions.

Safe practices have developed from past experience in the use of welding and cutting. These practices must be learned through study and training before using this equipment. Some of these practices apply to equipment connected to power lines; other practices apply to engine driven equipment. Anyone not having extensive training in welding and cutting practices should not attempt to weld.

Safe practices are outlined in the Australian Standard AS1674.2-2007 entitled: Safety in welding and allied processes Part 2: Electrical. This publication and other guides to what you should learn before operating this equipment are listed at the end of these safety precautions. **HAVE ALL INSTALLATION, OPERATION, MAINTENANCE, AND REPAIR WORK PERFORMED ONLY BY QUALIFIED PEOPLE.**

### 1.01 Arc Welding Hazards

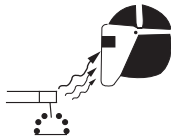


### WARNING

***ELECTRIC SHOCK can kill.***

*Touching live electrical parts can cause fatal shocks or severe burns. The electrode and work circuit is electrically live whenever the output is on. The input power circuit and machine internal circuits are also live when power is on. In semiautomatic or automatic wire welding, the wire, wire reel, drive roll housing, and all metal parts touching the welding wire are electrically live. Incorrectly installed or improperly grounded equipment is a hazard.*

1. Do not touch live electrical parts.
2. Wear dry, hole-free insulating gloves and body protection.
3. Insulate yourself from work and ground using dry insulating mats or covers.
4. Disconnect input power or stop engine before installing or servicing this equipment. Lock input power disconnect switch open, or remove line fuses so power cannot be turned on accidentally.
5. Properly install and ground this equipment according to its Owner's Manual and national, state, and local codes.
6. Turn off all equipment when not in use. Disconnect power to equipment if it will be left unattended or out of service.
7. Use fully insulated electrode holders. Never dip holder in water to cool it or lay it down on the ground or the work surface. Do not touch holders connected to two welding machines at the same time or touch other people with the holder or electrode.
8. Do not use worn, damaged, undersized, or poorly spliced cables.
9. Do not wrap cables around your body.
10. Ground the workpiece to a good electrical (earth) ground.
11. Do not touch electrode while in contact with the work (ground) circuit.
12. Use only well-maintained equipment. Repair or replace damaged parts at once.
13. In confined spaces or damp locations, do not use a welder with AC output unless it is equipped with a voltage reducer. Use equipment with DC output.
14. Wear a safety harness to prevent falling if working above floor level.
15. Keep all panels and covers securely in place.


**WARNING**

*ARC RAYS can burn eyes and skin; NOISE can damage hearing.*

*Arc rays from the welding process produce intense heat and strong ultraviolet rays that can burn eyes and skin. Noise from some processes can damage hearing.*

1. Use a Welding Helmet or Welding Faceshield fitted with a proper shade of filter (see ANSI Z49.1 and AS 1674 listed in Safety Standards) to protect your face and eyes when welding or watching.
2. Wear approved safety glasses. Side shields recommended.
3. Use protective screens or barriers to protect others from flash and glare; warn others not to watch the arc.
4. Wear protective clothing made from durable, flame-resistant material (wool and leather) and foot protection.
5. Use approved ear plugs or ear muffs if noise level is high.
6. Never wear contact lenses while welding.

| Recommended Protective Filters for Electric Welding                         |  |                                   |
|---|--|-----------------------------------|
| Description of Process  | Approximate Range of Welding Current in Amps | Minimum Shade Number of Filter(s) |
| Manual Metal Arc Welding - covered electrodes (MMAW)                        | Less than or equal to 100                    | 8                                 |
|   | 100 to 200                                   | 10                                |
|   | 200 to 300                                   | 11                                |
|   | 300 to 400                                   | 12                                |
|   | Greater than 400                             | 13                                |
| Gas Metal Arc Welding (GMAW) (MIG) other than Aluminium and Stainless Steel | Less than or equal to 150                    | 10                                |
|   | 150 to 250                                   | 11                                |
|   | 250 to 300                                   | 12                                |
|   | 300 to 400                                   | 13                                |
|   | Greater than 400                             | 14                                |
| Gas Metal Arc Welding (GMAW) (MIG) Aluminium and Stainless Steel            | Less than or equal to 250                    | 12                                |
|   | 250 to 350                                   | 13                                |
| Gas Tungsten Arc Welding (GTAW) (TIG)                                       | Less than or equal to 100                    | 10                                |
|   | 100 to 200                                   | 11                                |
|   | 200 to 250                                   | 12                                |
|   | 250 to 350                                   | 13                                |
|   | Greater than 350                             | 14                                |
| Flux-cored Arc Welding (FCAW) -with or without shielding gas.               | Less than or equal to 300                    | 11                                |
|   | 300 to 400                                   | 12                                |
|   | 400 to 500                                   | 13                                |
|   | Greater than 500                             | 14                                |
| Air - Arc Gouging   | Less than or equal to 400                    | 12                                |
| Plasma - Arc Cutting  | 50 to 100                                    | 10                                |
|   | 100 to 400                                   | 12                                |
|   | 400 to 800                                   | 14                                |
| Plasma - Arc Spraying   | —  | 15                                |
| Plasma - Arc Welding  | Less than or equal to 20                     | 8                                 |
|   | 20 to 100                                    | 10                                |
|   | 100 to 400                                   | 12                                |
|   | 400 to 800                                   | 14                                |
| Submerged - Arc Welding   | —  | 2(5)                              |
| Resistance Welding  | —  | Safety Spectacles or eye shield   |

Refer to standard AS/NZS 1338.1:1992 for comprehensive information regarding the above table.

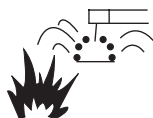


**WARNING**

*FUMES AND GASES can be hazardous to your health.*

*Welding produces fumes and gases. Breathing these fumes and gases can be hazardous to your health.*

1. Keep your head out of the fumes. Do not breathe the fumes.
2. If inside, ventilate the area and/or use exhaust at the arc to remove welding fumes and gases.
3. If ventilation is poor, use an approved air-supplied respirator.
4. Read the Material Safety Data Sheets (MSDSs) and the manufacturer's instruction for metals, consumables, coatings, and cleaners.
5. Work in a confined space only if it is well ventilated, or while wearing an air-supplied respirator. Shielding gases used for welding can displace air causing injury or death. Be sure the breathing air is safe.
6. Do not weld in locations near degreasing, cleaning, or spraying operations. The heat and rays of the arc can react with vapours to form highly toxic and irritating gases.
7. Do not weld on coated metals, such as galvanized, lead, or cadmium plated steel, unless the coating is removed from the weld area, the area is well ventilated, and if necessary, while wearing an air-supplied respirator. The coatings and any metals containing these elements can give off toxic fumes if welded.

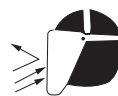
**WARNING**

*WELDING can cause fire or explosion.*

*Sparks and spatter fly off from the welding arc. The flying sparks and hot metal, weld spatter, hot workpiece, and hot equipment can cause fires and burns. Accidental contact of electrode or welding wire to metal objects can cause sparks, overheating, or fire.*

1. Protect yourself and others from flying sparks and hot metal.
2. Do not weld where flying sparks can strike flammable material.

3. Remove all flammables within 35 ft (10.7 m) of the welding arc. If this is not possible, tightly cover them with approved covers.
4. Be alert that welding sparks and hot materials from welding can easily go through small cracks and openings to adjacent areas.
5. Watch for fire, and keep a fire extinguisher nearby.
6. Be aware that welding on a ceiling, floor, bulkhead, or partition can cause fire on the hidden side.
7. Do not weld on closed containers such as tanks or drums.
8. Connect work cable to the work as close to the welding area as practical to prevent welding current from travelling long, possibly unknown paths and causing electric shock and fire hazards.
9. Do not use welder to thaw frozen pipes.
10. Remove stick electrode from holder or cut off welding wire at contact tip when not in use.

**WARNING**

*FLYING SPARKS AND HOT METAL can cause injury.*

*Chipping and grinding cause flying metal. As welds cool, they can throw off slag.*

1. Wear approved face shield or safety goggles. Side shields recommended.
2. Wear proper body protection to protect skin.

**WARNING**

*CYLINDERS can explode if damaged.*

*Shielding gas cylinders contain gas under high pressure. If damaged, a cylinder can explode. Since gas cylinders are normally part of the welding process, be sure to treat them carefully.*

1. Protect compressed gas cylinders from excessive heat, mechanical shocks, and arcs.
2. Install and secure cylinders in an upright position by chaining them to a stationary support or equipment cylinder rack to prevent falling or tipping.
3. Keep cylinders away from any welding or other electrical circuits.
4. Never allow a welding electrode to touch any cylinder.

5. Use only correct shielding gas cylinders, regulators, hoses, and fittings designed for the specific application; maintain them and associated parts in good condition.
6. Turn face away from valve outlet when opening cylinder valve.
7. Keep protective cap in place over valve except when cylinder is in use or connected for use.
8. Read and follow instructions on compressed gas cylinders, associated equipment, and CGA publication P-1 listed in Safety Standards.



### **WARNING**

*MOVING PARTS can cause injury.*

Moving parts, such as fans, rotors, and belts can cut fingers and hands and catch loose clothing.

1. Keep all doors, panels, covers, and guards closed and securely in place.
2. Stop engine before installing or connecting unit.
3. Have only qualified people remove guards or covers for maintenance and troubleshooting as necessary.
4. To prevent accidental starting during servicing, disconnect negative (-) battery cable from battery.
5. Keep hands, hair, loose clothing, and tools away from moving parts.
6. Reinstall panels or guards and close doors when servicing is finished and before starting engine.



### **WARNING**

*This product, when used for welding or cutting, produces fumes or gases which contain chemicals known to the State of California to cause birth defects and, in some cases, cancer. (California Health & Safety code Sec. 25249.5 et seq.)*

### **NOTE**

*Considerations About Welding And The Effects of Low Frequency Electric and Magnetic Fields*

The following is a quotation from the General Conclusions Section of the U.S. Congress, Office of Technology Assessment, Biological Effects of Power Frequency Electric & Magnetic Fields - Background Paper, OTA-BP-E-63 (Washington, DC: U.S. Government Printing Office, May 1989): "...there is now

a very large volume of scientific findings based on experiments at the cellular level and from studies with animals and people which clearly establish that low frequency magnetic fields and interact with, and produce changes in, biological systems. While most of this work is of very high quality, the results are complex. Current scientific understanding does not yet allow us to interpret the evidence in a single coherent framework. Even more frustrating, it does not yet allow us to draw definite conclusions about questions of possible risk or to offer clear science-based advice on strategies to minimize or avoid potential risks."

To reduce magnetic fields in the workplace, use the following procedures.

1. Keep cables close together by twisting or taping them.
2. Arrange cables to one side and away from the operator.
3. Do not coil or drape cable around the body.
4. Keep welding power source and cables as far away from body as practical.



### **ABOUT PACEMAKERS:**

*The above procedures are among those also normally recommended for pacemaker wearers. Consult your doctor for complete information.*

## **1.02 Principal Safety Standards**

Safety in Welding and Cutting, ANSI Standard Z49.1, from American Welding Society, 550 N.W. LeJeune Rd., Miami, FL 33126.

Safety and Health Standards, OSHA 29 CFR 1910, from Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

Recommended Safe Practices for the Preparation for Welding and Cutting of Containers That Have Held Hazardous Substances, American Welding Society Standard AWS F4.1, from American Welding Society, 550 N.W. LeJeune Rd., Miami, FL 33126.

National Electrical Code, NFPA Standard 70, from National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

Safe Handling of Compressed Gases in Cylinders, CGA Pamphlet P-1, from Compressed Gas Association, 1235 Jefferson Davis Highway, Suite 501, Arlington, VA 22202.

Code for Safety in Welding and Cutting, CSA Standard W117.2, from Canadian Standards Association, Standards Sales, 178 Rexdale Boulevard, Rexdale, Ontario, Canada M9W 1R3.

Safe Practices for Occupation and Educational Eye and Face Protection, ANSI Standard Z87.1, from American National Standards Institute, 1430 Broadway, New York, NY 10018.

Cutting and Welding Processes, NFPA Standard 51B, from National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

Safety in welding and allied processes Part 1: Fire Precautions, AS 1674.1-1997 from SAI Global Limited, [www.saiglobal.com](http://www.saiglobal.com).

Safety in welding and allied processes Part 2: Electrical, AS 1674.2-2007 from SAI Global Limited, [www.saiglobal.com](http://www.saiglobal.com).

Filters for eye protectors - Filters for protection against radiation generated in welding and allied operations AS/NZS 1338.1:1992 from SAI Global Limited, [www.saiglobal.com](http://www.saiglobal.com).

## 1.03 Declaration of Conformity

Manufacturer: CIGWELD  
Address: 71 Gower St, Preston  
Victoria 3072  
  
Australia



Description of equipment: Welding Equipment (GTAW, MMAW) including, but not limited to CIGWELD Transarc 170i Welding Inverter and associated accessories.

Serial numbers are unique with each individual piece of equipment and details description, parts used to manufacture a unit and date of manufacture.

The equipment conforms to all applicable aspects and regulations of the 'Low Voltage Directive' (2006/95 EC) and to the National legislation for the enforcement of the Directive.

### National Standard and Technical Specifications

The product is designed and manufactured to a number of standards and technical requirements among them are:

- IEC 60974-10 applicable to Industrial Equipment - generic emissions and regulations.
- AS 1674 Safety in welding and allied processes.
- AS 60974.1 / IEC 60974-1 applicable to welding equipment and associated accessories.

Extensive product design verification is conducted at the manufacturing facility as part of the routine design and manufacturing process, to ensure the product is safe and performs as specified. Rigorous testing is incorporated into the manufacturing process to ensure the manufactured product meets or exceeds all design specifications.

CIGWELD has been manufacturing and merchandising an extensive equipment range with superior performance, ultra safe operation and world class quality for more than 30 years and will continue to achieve excellence.

## SECTION 2: INTRODUCTION

### 2.01 How To Use This Manual

To ensure safe operation, read the entire manual, including the chapter on safety instructions and warnings.

Throughout this manual, the words WARNING, CAUTION, and NOTE may appear. Pay particular attention to the information provided under these headings. These special annotations are easily recognized as follows:



#### **WARNING**

*A WARNING gives information regarding possible personal injury.*



#### **CAUTION**

*A CAUTION refers to possible equipment damage.*

#### **NOTE**

*A NOTE offers helpful information concerning certain operating procedures.*

Additional copies of this manual may be purchased by contacting Cigweld at the address and phone number for your location listed in the inside back cover of this manual. Include the Owner's Manual number and equipment identification numbers.

### 2.02 Equipment Identification

The unit's identification number (specification or part number), model, and serial number usually appear on a nameplate attached to the control panel. In some cases, the nameplate may be attached to the rear panel. Equipment which does not have a control panel such as gun and cable assemblies is identified only by the specification or part number printed on the shipping container. Record these numbers on the bottom of page i for future reference.

### 2.03 Receipt Of Equipment

When you receive the equipment, check it against the invoice to make sure it is complete and inspect the equipment for possible damage due to shipping. If there is any damage, notify the carrier immediately to file a claim. Furnish complete information concerning damage claims or shipping errors to the location in your area listed in the inside back cover of this manual.

Include all equipment identification numbers as described above along with a full description of the parts in error.

Move the equipment to the installation site before un-crating the unit. Use care to avoid damaging the equipment when using bars, hammers, etc., to uncrate the unit.

## 2.04 Symbol Chart

Note that only some of these symbols will appear on your model.

|  |                                   |  |  |   |  |
|--|-----------------------------------|--|--|---|--|
|  | On                                |  | Single Phase   |   | Wire Feed Function                                   |
|  | Off                               |  | Three Phase  |   | Wire Feed Towards Workpiece With Output Voltage Off. |
|  | Dangerous Voltage                 |  | Three Phase Static Frequency Converter-Transformer-Rectifier |   | Welding Gun  |
|  | Increase/Decrease                 |  | Remote   |   | Purging Of Gas                                       |
|  | Circuit Breaker                   |  | Duty Cycle   |   | Continuous Weld Mode                                 |
|  | AC Auxiliary Power                |  | Percentage   |   | Spot Weld Mode                                       |
|  | Fuse                              |  | Panel/Local  |   | Spot Time  |
|  | Amperage                          |  | Shielded Metal Arc Welding (SMAW)                            |   | Preflow Time   |
|  | Voltage                           |  | Gas Metal Arc Welding (GMAW)                                 |   | Postflow Time  |
|  | Hertz (cycles/sec)                |  | Gas Tungsten Arc Welding (GTAW)                              | <b>2 Step Trigger Operation</b><br>Press to initiate wirefeed and welding, release to stop.                                   |  |
|  | Frequency                         |  | Air Carbon Arc Cutting (CAC-A)                               | <b>4 Step Trigger Operation</b><br>Press and hold for preflow, release to start arc. Press to stop arc, and hold for preflow. |  |
|  | Negative                          |  | Constant Current   |   | Burnback Time  |
|  | Positive                          |  | Constant Voltage Or Constant Potential                       |   | Disturbance In Ground System                         |
|  | Direct Current (DC)               |  | High Temperature   |   | Inches Per Minute                                    |
|  | Protective Earth (Ground)         |  | Fault Indication   |   | Meters Per Minute                                    |
|  | Line                              |  | Arc Force  |   |  |
|  | Line Connection                   |  | Touch Start (GTAW)   |   |  |
|  | Auxiliary Power                   |  | Variable Inductance  |   |  |
|  | Receptacle Rating-Auxiliary Power |  | Voltage Input  |   |  |

Art# A-04937

## 2.05 Description

The Cigweld Transarc 170i is a self contained single phase multi process welding inverter that is capable of performing MMAW (Stick) and GTAW (Lift TIG) welding processes. The unit is equipped with an integrated voltage reduction device (VRD applicable in stick mode only), digital amperage/voltage meter, and a host of other features in order to fully satisfy the broad operating needs of the modern welding professional. The unit is also fully compliant to Australian Standard AS 60974.1 and IEC 60974.1.

The Transarc 170i provides excellent welding performance across a broad range of applications when used with the correct welding consumables and procedures. The following instructions detail how to correctly and safely set up the machine and give guidelines on gaining the best efficiency and quality from the Power Source. Please read these instructions thoroughly before using the unit.

## 2.06 User Responsibility

This equipment will perform as per the information contained herein when installed, operated, maintained and repaired in accordance with the instructions provided. This equipment must be checked periodically. Defective equipment (including welding leads) should not be used. Parts that are broken, missing, plainly worn, distorted or contaminated, should be replaced immediately. Should such repairs or replacements become necessary, it is recommended that such repairs be carried out by appropriately qualified persons approved by CIGWELD. Advice in this regard can be obtained by contacting an Accredited CIGWELD Distributor.

This equipment or any of its parts should not be altered from standard specification without prior written approval of CIGWELD. The user of this equipment shall have the sole responsibility for any malfunction which results from improper use or unauthorized modification from standard specification, faulty maintenance, damage or improper repair by anyone other than appropriately qualified persons approved by CIGWELD.

## 2.07 Transporting Methods

This unit is equipped with a handle for carrying purposes.



**WARNING**

*ELECTRIC SHOCK can kill. DO NOT TOUCH live electrical parts. Disconnect input power conductors from de-energized supply line before moving the welding power source.*



**WARNING**

*FALLING EQUIPMENT can cause serious personal injury and equipment damage.*

Lift unit with handle on top of case.

Use handcart or similar device of adequate capacity.

If using a fork lift vehicle, place and secure unit on a proper skid before transporting.

## 2.08 Packaged Items

Transarc 170i Plant (Part No. W1007170)

- Transarc 170i Inverter Power Source
- Handipak of electrodes, Satinraft 13
- Electrode Holder with 4m Lead
- Work Clamp with 4m Lead
- Shoulder Strap
- Product Bag
- Operating Manual

Transarc 170i Mine Spec Plant (Part No. W1007171)

- Transarc 170i Mine Spec Inverter Power Source
- Handipak of electrodes, Satinraft 13
- Mine Spec Electrode Holder with 4m Lead
- Work Clamp with 4m Lead
- Shoulder Strap
- Product Bag
- Operating Manual

Transarc 170i Mine Spec Power Source (Part No. W1007169)

- Transarc 170i Mine Spec Inverter Power Source
- Shoulder Strap
- Operating Manual



**2.09 Duty Cycle**

The rated duty cycle of a Welding Power Source, is a statement of the time it may be operated at its rated welding current output without exceeding the temperature limits of the insulation of the component parts. To explain the 10 minute duty cycle period the following example is used. Suppose a Welding Power Source is designed to operate at a 30% duty cycle, 170 amperes at 26.8 volts. This means that it has been designed and built to provide the rated amperage (170A) for 3.0 minutes, i.e. arc welding time, out of every 10 minute period (30% of 10 minutes is 3.0 minutes). During the other 7.0 minutes of the 10 minute period the Welding Power Source must idle and be allowed to cool.

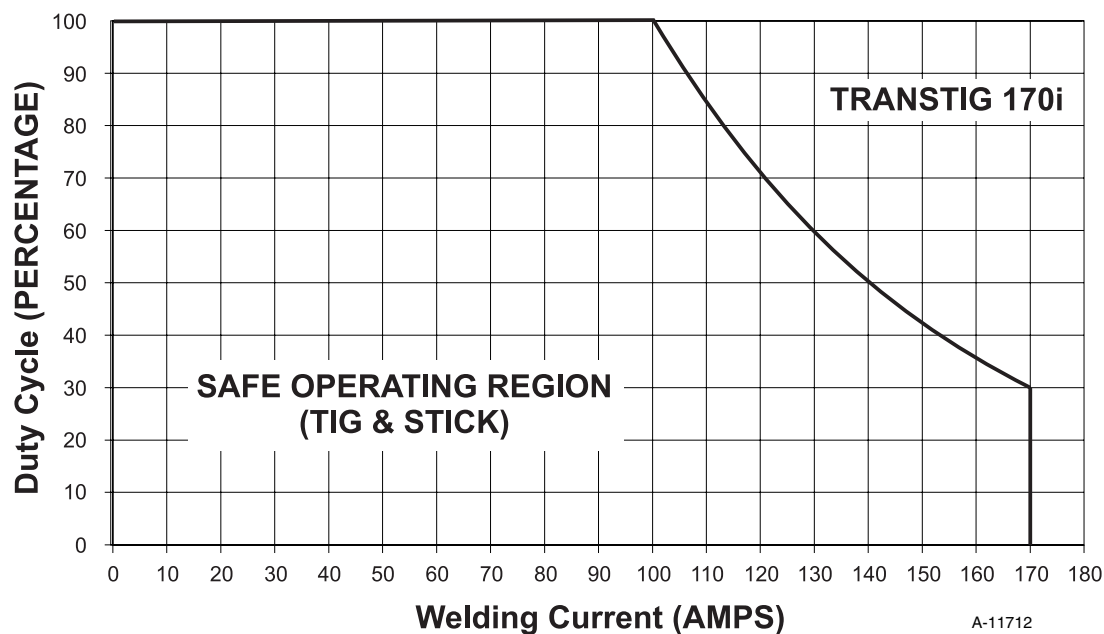


Figure 2-1: Transarc 170i Duty Cycle



## 2.10 Specifications

| Description  | Transarc 170i  |
|--|--|
| Plant Part No  | W1007170   |
| Plant Part No(Mine Spec)                                     | W1007171   |
| Power Source Part No(Mine Spec)                              | W1007169   |
| Power Source Dimensions                                      | H324mmxW122mmxD458mm   |
| Power Source Mass  | 11 KG  |
| Cooling  | Fan Cooled   |
| Welder Type  | Multi Process Inverter Power Source                          |
| Australian Standard  | AS 60974.1-2006 / IEC 60974.1                                |
| Number of Phases   | Single Phase   |
| Nominal Supply Voltage                                       | 240V $\pm$ 15%   |
| Nominal Supply Frequency                                     | 50/60Hz  |
| Welding Current Range  | 5-170A   |
| Nominal DC Open Circuit Voltage (VRD ON)                     | 8V   |
| Nominal DC Open Circuit Voltage (VRD OFF)                    | 66V  |
| Factory Fitted Supply Plug Rating                            | 15 Amps  |
| Effective Input Current ( $I_{1eff}$ ) refer Note 2          | 13 Amps  |
| Maximum Input Current ( $I_{1max}$ )                         | 23.5 Amps  |
| Minimum Single Phase Generator Recommendation (refer Note 4) | 6.6k W (8.5k VA at 0.8 PF)                                   |
| STICK (MMAW) Welding Output, 40°C, 10 min.                   | 170A @ 30%, 26.8V<br>130A @ 60%, 25.2V<br>100A @ 100%, 24.0V |
| TIG (GTAW) Welding Output, 40°C, 10 min.                     | 170A @ 30%, 16.8V<br>130A @ 60%, 15.2V<br>100A @ 100%, 14.0V |
| Protection Class   | IP23S  |

Table 2-1: Transarc 170i Specifications

### NOTE 1

*Due to variations that can occur in manufactured products, claimed performance, voltages, ratings, all capacities, measurements, dimensions and weights quoted are approximate only. Achievable capacities and ratings in use and operation will depend upon correct installation, use, applications, maintenance and service.*

### NOTE 2

*The Effective Input Current should be used for the determination of cable size & supply requirements.*

### NOTE 3

*Motor start fuses or thermal circuit breakers are recommended for this application. Check local requirements for your situation in this regard.*

**NOTE 4**

*Minimum Generator Recommendation at the Maximum Output Duty Cycle.*

*Due to large variations in performance and specifications of different brands and types of generators, Cigweld cannot guarantee full welding output power or duty cycle on every brand or type of generator.*

*Some small generators incorporate low cost circuit breakers on their outputs. These circuit breakers usually will have a small reset button, and will trip much faster than a switchboard type circuit breaker. This may result in not being able to achieve full output or duty cycle from the power source / generator combination. For this reason we recommend a generator that incorporates switchboard type circuit breakers.*

*Cigweld recommends that when selecting a generator, that the particular power source / generator combination be adequately trialled to ensure the combination performs to the users expectations.*

**NOTE 5**

*CIGWELD reserves the right to change product performance and specifications without notice.*

**2.11 Options and Accessories**

| DESCRIPTION  | PART NUMBER |
|--|-------------|
| TIG Torch 26V with 4m lead and remote control                    | W4014604    |
| TIG Torch accessory kit  | BGSAK2      |
| Foot Control with 8m lead  | W4015800    |
| Electrode Holder & Work Lead Set 8m 400A 50mm <sup>2</sup> DINSE | 646325      |
| Electrode Holder with trigger switch and 4m lead                 | 646761      |
| 50mm <sup>2</sup> Male DINSE cable connector                     | 704461      |
| Naka Measurement Gauge   | 646265      |
| Shielding Gas Hose Assembly, 3M                                  | W7004913    |

Table 2-2: Transarc 170i Options and Accessories

## SECTION 3: INSTALLATION, OPERATION AND SETUP

### 3.01 Environment

These units are designed for use in environments with increased hazard of electric shock as outlined in AS 60974.1 and AS 1674.2.

- A. Examples of environments with increased hazard of electric shock are:
1. In locations in which freedom of movement is restricted, so that the operator is forced to perform the work in a cramped (kneeling, sitting or lying) position with physical contact with conductive parts.
  2. In locations which are fully or partially limited by conductive elements, and in which there is a high risk of unavoidable or accidental contact by the operator.
  3. In wet or damp hot locations where humidity or perspiration considerable reduces the skin resistance of the human body and the insulation properties of accessories.
- B. Environments with increased hazard of electric shock do not include places where electrically conductive parts in the near vicinity of the operator, which can cause increased hazard, have been insulated.

### 3.02 Location

Be sure to locate the welder according to the following guidelines:

- A. In areas, free from moisture and dust.
- B. Ambient temperature between 0° C to 40° C.
- C. In areas, free from oil, steam and corrosive gases.
- D. In areas, not subjected to abnormal vibration or shock.
- E. In areas, not exposed to direct sunlight or rain.
- F. Place at a distance of 300mm or more from walls or similar that could restrict natural air flow for cooling.
- G. The enclosure design of this power source meets the requirements of IP23S as outlined in AS60529. This provides adequate protection against solid objects (greater than 12mm), and direct protection from vertical drops. Under no circumstances should the unit be operated or connected in a micro environment that will exceed the stated

conditions. For further information please refer to AS 60529.

- H. Precautions must be taken against the power source toppling over. The power source must be located on a suitable horizontal surface in the upright position when in use.

### 3.03 Ventilation

Since the inhalation of welding fumes can be harmful, ensure that the welding area is effectively ventilated.

### 3.04 Mains Supply Voltage Requirements

The Mains supply voltage should be within  $\pm 15\%$  of the rated mains supply voltage. Too low a voltage may cause poor welding performance. Too high a supply voltage will cause components to overheat and possibly fail.

The Welding Power Source must be:

- Correctly installed, if necessary, by a qualified electrician.
- Correctly earthed (electrically) in accordance with local regulations.
- Connected to the correct size power point and fuse as per the Specifications on page 2-5.



**WARNING**

*Any electrical work must be carried out by a qualified Electrical Tradesperson.*

### 3.05 Electromagnetic Compatibility



**WARNING**

*Extra precautions for Electromagnetic Compatibility may be required when this Welding Power Source is used in a domestic situation.*

#### A. Installation and Use - Users Responsibility

The user is responsible for installing and using the welding equipment according to the manufacturer's instructions. If electromagnetic disturbances are detected then it shall be the responsibility of the user of the welding equipment to resolve the situation with the technical assistance of the manufacturer. In some cases this remedial

action may be as simple as earthing the welding circuit, see NOTE below. In other cases it could involve constructing an electromagnetic screen enclosing the Welding Power Source and the work, complete with associated input filters. In all cases, electromagnetic disturbances shall be reduced to the point where they are no longer troublesome.

---

**NOTE**

*The welding circuit may or may not be earthed for safety reasons. Changing the earthing arrangements should only be authorised by a person who is competent to assess whether the changes will increase the risk of injury, e.g. by allowing parallel welding current return paths which may damage the earth circuits of other equipment. Further guidance is given in IEC 60974-13 Arc Welding Equipment - Installation and use (under preparation).*

**B. Assessment of Area**

Before installing welding equipment, the user shall make an assessment of potential electromagnetic problems in the surrounding area. The following shall be taken into account

1. Other supply cables, control cables, signalling and telephone cables; above, below and adjacent to the welding equipment.
2. Radio and television transmitters and receivers.
3. Computer and other control equipment.
4. Safety critical equipment, e.g. guarding of industrial equipment.
5. The health of people around, e.g. the use of pacemakers and hearing aids.
6. Equipment used for calibration and measurement.
7. The time of day that welding or other activities are to be carried out.
8. The immunity of other equipment in the environment: the user shall ensure that other equipment being used in the environment is compatible: this may require additional protection measures.

The size of the surrounding area to be considered will depend on the structure of the building and other activities that are taking place. The surrounding area may extend beyond the boundaries of the premises.

**C. Methods of Reducing Electromagnetic Emissions**

**1. Mains Supply**

Welding equipment should be connected to the mains supply according to the manufacturer's recommendations. If interference occurs, it may be necessary to take additional precautions such as filtering of the mains supply. Consideration should be given to shielding the supply cable of permanently installed welding equipment in metallic conduit or equivalent. Shielding should be electrically continuous throughout its length. The shielding should be connected to the Welding Power Source so that good electrical contact is maintained between the conduit and the Welding Power Source enclosure.

**2. Maintenance of Welding Equipment**

The welding equipment should be routinely maintained according to the manufacturer's recommendations. All access and service doors and covers should be closed and properly fastened when the welding equipment is in operation. The welding equipment should not be modified in any way except for those changes and adjustments covered in the manufacturer's instructions. In particular, the spark gaps of arc striking and stabilising devices should be adjusted and maintained according to the manufacturer's recommendations.

**3. Welding Cables**

The welding cables should be kept as short as possible and should be positioned close together, running at or close to the floor level.

**4. Equipotential Bonding**

Bonding of all metallic components in the welding installation and adjacent to it should be considered. However. Metallic components bonded to the work piece will increase the risk that the operator could receive a shock by touching the metallic components and the electrode at the same time. The operator should be insulated from all such bonded metallic components.

## 5. Earthing of the Workpiece

Where the workpiece is not bonded to earth for electrical safety, nor connected to earth because of its size and position, e.g. ship's hull or building steelwork, a connection bonding the workpiece to earth may reduce emissions in some, but not all instances. Care should be taken to prevent the earthing of the workpiece increasing the risk of injury to users, or damage to other electrical equipment. Where necessary, the connection of the workpiece to earth should be made by direct connection to the workpiece, but in some countries where direct connection is not permitted, the bonding should be achieved by suitable capacitance, selected according to national regulations.

## 6. Screening and Shielding

Selective screening and shielding of other cables and equipment in the surrounding area may alleviate problems of interference. Screening the entire welding installation may be considered for special applications.

## 3.06 Transarc 170i Power Source Controls, Indicators and Features

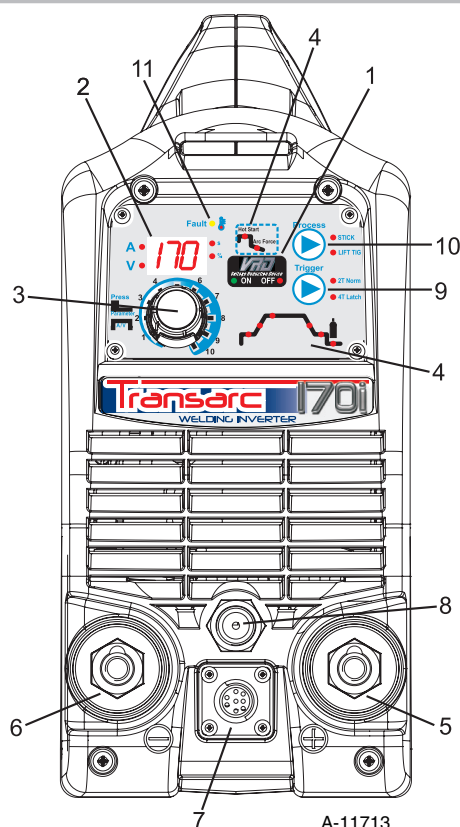


Figure 3-1: Front Panel

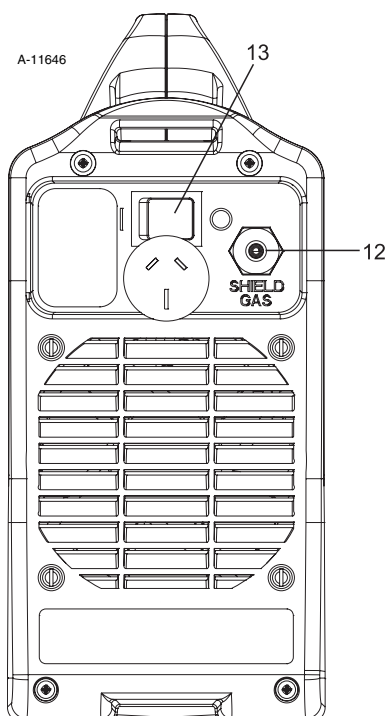


Figure 3-2: Rear Panel

### 1. VRD ON/OFF Indicator Lights

A VRD (voltage reduction device) is a hazard reducing device designed to reduce electric shock hazards present on the output of welding power source when operating in MMAW (stick) mode. Note that the presence of VRD should not be used as a substitute for the use of appropriate safety practices as indicated in section one of this manual.

Both the green and red indicator lights only operate in MMAW (stick) mode.

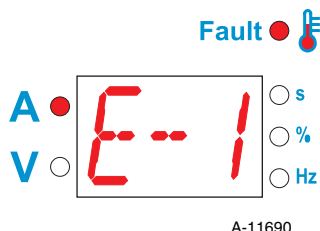
The green VRD ON light illuminates (red light is off) when the VRD is active. Under this condition the open circuit voltage of the unit is limited to below 10V DC, thus reducing the potential of serious electric shock (such as when changing electrodes).

The red VRD OFF light illuminates (green light is off) when the VRD is inactive. Under this condition the output voltage of the unit will be at welding potential which in some cases may exceed 25V DC.

## Fail to safe operation

This welding power source is also protected by a special protection feature called "Fail to Safe Operation" which is available in this model. The output of the power source will be disabled and the fault indicator will illuminate if the "Fail to Safe" protection has operated. The "Fail to Safe" protection will not automatically reset. The mains power switch must be turned off to reset the power source.

The display will also show error code E-1 if the "Fail to Safe" protection has operated.



## 2. Digital Meter (Amps and Volts)

The digital meter is used to display the pre-set parameter values (when not welding) and actual output current or voltage (when welding) of the power source. A long press (>2s) on the Multi Function Control toggles between the display of amps and volts.

If you are in "amps display" mode, when not welding, long press of more than 2 seconds on the Multi Function Control will set the 170i to "volts display" mode, the meter will show actual output volts for 5 seconds, then revert to "amps display" and allows adjustment of parameters. During welding, the meter will show actual welding volts when selected.

If you are in "volts display" mode, when not welding, long press of more than 2 seconds on the Multi Function Control will set the 170i to "amps display" and allows adjustment of parameters. During welding, the meter will show actual welding amps when selected.

At the completion of welding, the meter will hold the last recorded value for a period of approximately 10 seconds. During the hold time the display will flash to indicate the hold function is active. The meter will hold the value until; (1) the Multi Function Control is adjusted in which case the unit will revert to preview mode, (2) welding is recommenced, in which case actual welding amperage or voltage will be displayed, or (3) a period of 10 seconds elapses following the completion of welding in which case the unit will return to preview mode. The value displayed in preview mode and welding mode is steady (not flashing).

## 3. Multi Function Control

When not welding, the Multi Function Control is used to adjust all welding parameters, including welding amps. A short press on the Multi Function Control will save the parameter value, then increment to the next available parameter. The parameter LED will illuminate and the Multi Function Control will then adjust the parameter. The parameter value is shown on the meter (figure 3-1, Item 2) and the LED's next to the meter indicate if the parameter is Amps, Seconds, %, or Hz. Another press on the Multi Function Control will save the parameter value, then increment to the next available parameter. During welding, adjustment of the Multi Function Control will adjust the actual welding amps, no other parameters are adjustable during welding.

## 4. Parameter LED's (Weld Activity LED's)

When welding, the weld activity graph LED's will illuminate to indicate which weld sequence step is currently active. When not welding, the parameter LED will illuminate to show which parameter is currently being adjusted. In MMAW (Stick) mode, the adjustable parameters are weld current, hot start current & arc force. In GTAW (Lift Tig) mode, the adjustable parameters are initial current, up slope time, weld current, down slope time, crater current, post flow.



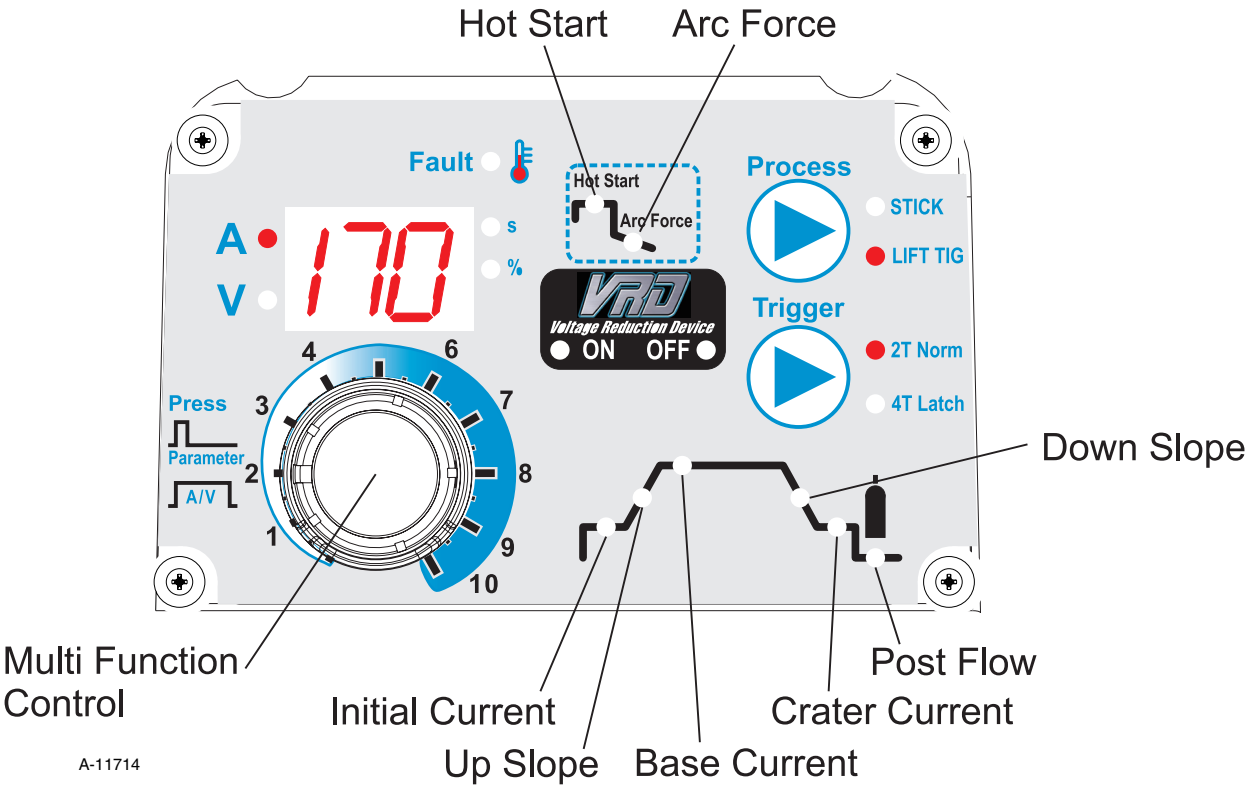


Figure 3-3: Programming Mode

STICK Programming Mode

| Programming Parameter   | Control Panel Display |
|---|-----------------------|
| <p><b>Hot Start</b></p> <p>This parameter operates in STICK mode to improve the start characteristics for stick electrodes</p> <p>HOT START current is on top of the BASE current.</p> <p>e.g. HOT START current = 130 amps when BASE (WELD) = 100 amps &amp; HOT START = 30 amps</p> <p>Range is 0 to 70A. Factory default is 20A. Note that maximum weld current is 170A.</p> |                       |

## TRANSARC 170i

| Programming Parameter   | Control Panel Display |
|---|-----------------------|
| <p><b>Base Current</b></p> <p>This parameter sets the STICK weld current.</p> <p>Range is 5 to 170A. Factory default is 120A.</p>   |                       |
| <p><b>Arc Force</b></p> <p>Arc Force is effective when in STICK mode only. Arc Force control provides an adjustable amount of Arc Force (or "dig") control. This feature can be particularly beneficial in providing the operator the ability to compensate for variability in joint fit-up in certain situations with particular electrodes. In general increasing the Arc Force control toward 100% (maximum Arc Force) allows greater penetration control to be achieved.</p> <p>Range is 0 to 100%. Factory default is 30%.</p> |                       |

### LIFT TIG Programming Mode

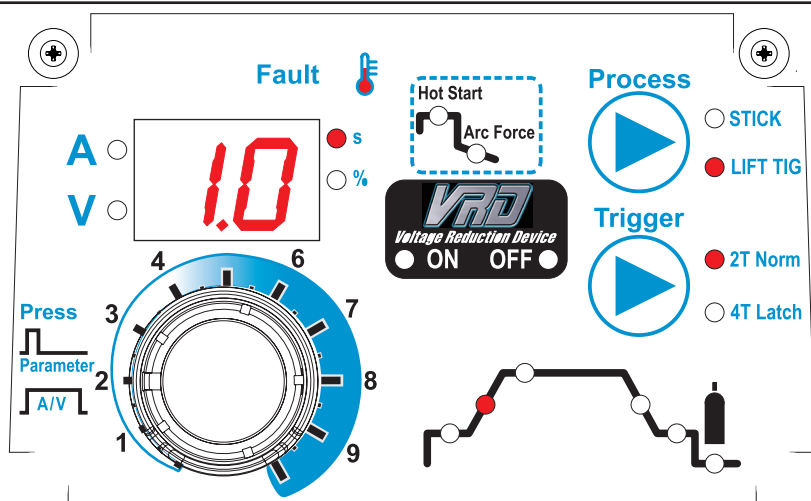
| Programming Parameter  | Control Panel Display |
|--|-----------------------|
| <p><b>Initial Current</b></p> <p>This parameter operates in TIG mode only and is used to set the start current for TIG. In 4T mode the Initial Current remains on until the torch trigger switch is released after it has been depressed. In 2T mode this is the Initial Current for the Up Slope current ramp.</p> <p>Range is 5 to 170A. Factory default is 30A.</p> |                       |



**Up Slope**

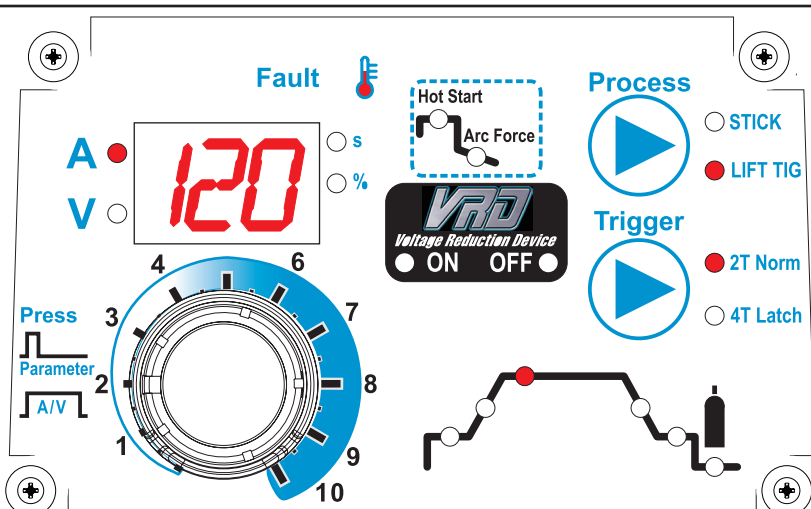
This parameter operates in TIG mode only and is used to set the time for the weld current to ramp up from INITIAL current to BASE current.

Range is 0.0 to 15.0 seconds. Factory default is 1.0 second.

**Base Current**

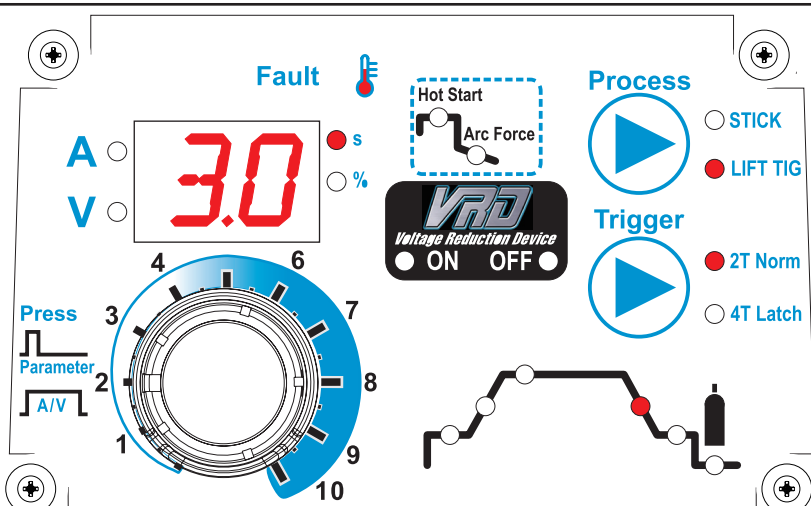
This parameter sets the TIG welding current.

Range is 5 to 170A. Factory default is 120A.

**Down Slope**

This parameter operates in TIG mode only and is used to set the time for the weld current to ramp down to the crater current. This control is used to eliminate the crater that can form at the completion of a weld.

Range is 0.0 to 25.0 seconds. Factory default is 3.0 seconds.



## TRANSARC 170i

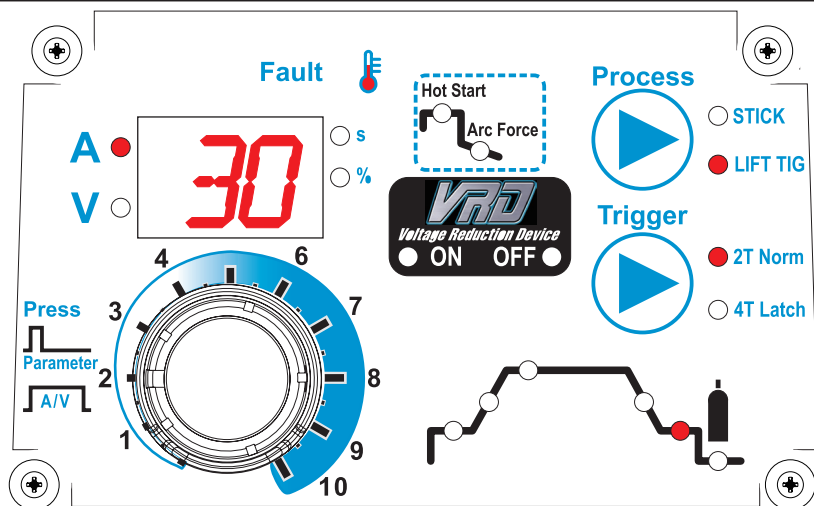
### Crater Current

This parameter operates in TIG mode only.

In 2T mode this is the current at the end of the down slope current ramp. When the welding current reaches the Crater Current value, the welding current will cease and the unit will enter Post Flow mode.

In 4T mode, this is the current at the end of the down slope current ramp. The welding current will remain at the Crater Current value until the torch trigger is released, at which time the welding current will cease and the unit will enter Post Flow mode.

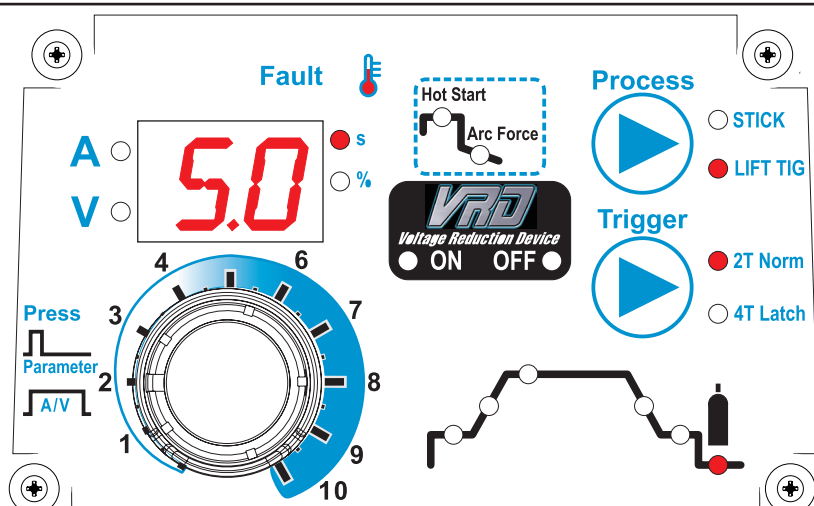
Range is 5 to 170A. Factory default is 30A.



### Post Flow

This parameter operates in TIG mode only and is used to adjust the post gas flow time once the arc has extinguished. This control is used to dramatically reduce oxidation of the tungsten electrode.

Range is 0.0 to 30.0 seconds. Factory default is 5.0 seconds.



## 5. Positive Welding Output Terminal

The positive welding terminal is used to connect the welding output of the power source to the electrode holder lead or work lead. Positive welding current flows from the power source via this heavy duty bayonet type terminal. It is essential, however, that the male plug is inserted and turned securely to achieve a sound electrical connection.



*Loose welding terminal connections can cause overheating and result in the male plug being fused in the bayonet terminal.*

## 6. Negative Welding Output Terminal

The negative welding terminal is used to connect the welding output of the power source to the TIG torch or work lead. Negative welding current flows to the power source via this heavy duty bayonet type terminal. It is essential, however, that the male plug is inserted and turned securely to achieve a sound electrical connection.

**CAUTION**

*Loose welding terminal connections can cause overheating and result in the male plug being fused in the bayonet terminal.*

## 7. Remote Control Socket

The 8 pin Remote Control Socket is used to connect remote control devices to the welding power source. To make connections, align keyway, insert plug, and rotate threaded collar fully clockwise.

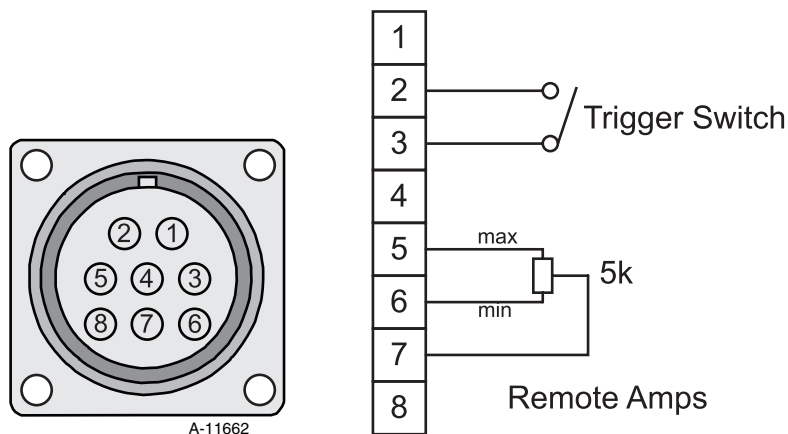


Figure 3-4: Remote Control Socket

| Socket Pin | Function  |
|------------|---|
| 1          | Not connected   |
| 2          | Trigger Switch Input  |
| 3          | Trigger Switch Input  |
| 4          | Not connected   |
| 5          | 5k ohm (maximum) connection to 5k ohm remote control potentiometer.               |
| 6          | Zero ohm (minimum) connection to 5k ohm remote control potentiometer.             |
| 7          | Wiper arm connection to 5k ohm remote control Amps GTAW (TIG) mode potentiometer. |
| 8          | Not connected.  |

Table 3-1

## 8. Shielding Gas Outlet

The Shielding Gas Outlet located on the front panel is a 5/8-18 UNF female gas fitting and is utilised for the connection of a suitable TIG Torch.

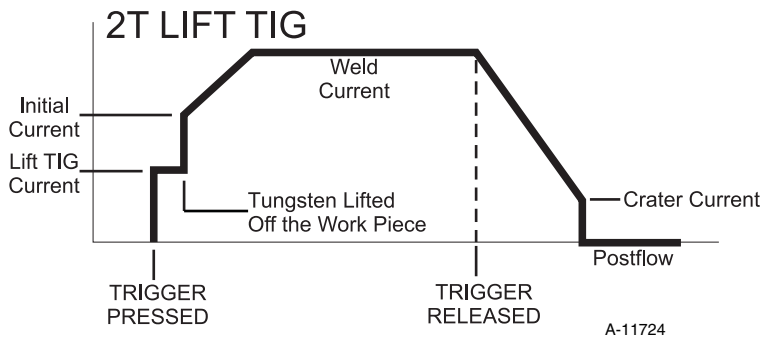
## 9. Trigger Mode Control

The trigger mode control is used to switch the functionality of the torch trigger between 2T (normal) and 4T (latch mode)

Note that pressing the Trigger Mode Button while turning the mains power on will perform a factory reset.

### 2T Normal Mode

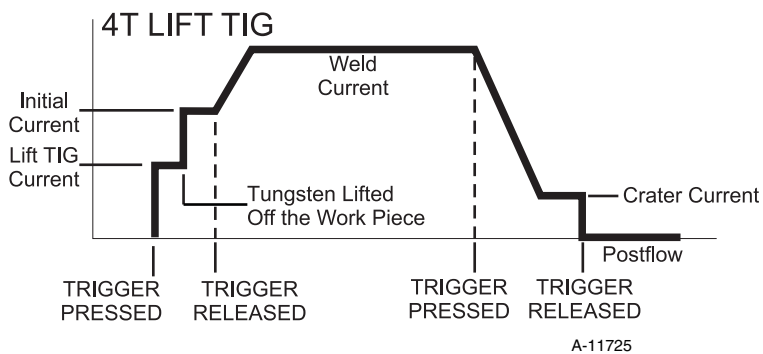
In this mode, the torch trigger must remain depressed for the welding output to be active. Press and hold the torch trigger to activate the power source (weld). Release the torch trigger switch to cease welding.



## 4T Latch Mode

This mode of welding is mainly used for long welding runs to reduce operator fatigue. In this mode the operator can press and release the torch trigger and the output will remain active. To deactivate the power source, the trigger switch must again be depressed and released, thus eliminating the need for the operator to hold the torch trigger.

Note that when operating in GTAW (TIG mode), the power source will remain activated until the selected downslope time has elapsed.



## STICK Dead Man Switch Mode (Transarc 170i Mines Spec Model)

A special trigger mode called “Dead Man Switch” mode is available on the 170i when welding with STICK electrodes. In this mode, there will be no output voltage at all from the Power Source until the trigger is pressed. This provides the greatest level of safety for the operator, and is mandatory on some work sites.

While the Dead Man Switch function greatly increases operator safety, standard welding safety procedures should still be followed.

When the trigger is pressed, the VRD voltage is activated and the user can start welding as normal. For extra safety, if welding has not commenced within 3 seconds after the trigger is pressed, the Power Source will turn off the VRD, and the trigger must be released & pressed again to start welding.

If the trigger is released during welding, all welding power is shut off within the time limits of normal VRD operation.

A special STICK electrode holder is required for use with a Power Source fitted with a Trigger Switch. This electrode holder has a trigger switch attached to it, and a control cable that connects to the remote control socket of the Power Source. The 170i Mine Spec plant comes standard with one of these special electrode holders fitted with an integrated trigger switch.

The Dead Man Switch function is active in both 2T and 4T STICK mode.

Welding with the Dead Man Switch is as follows:

### 2T MODE

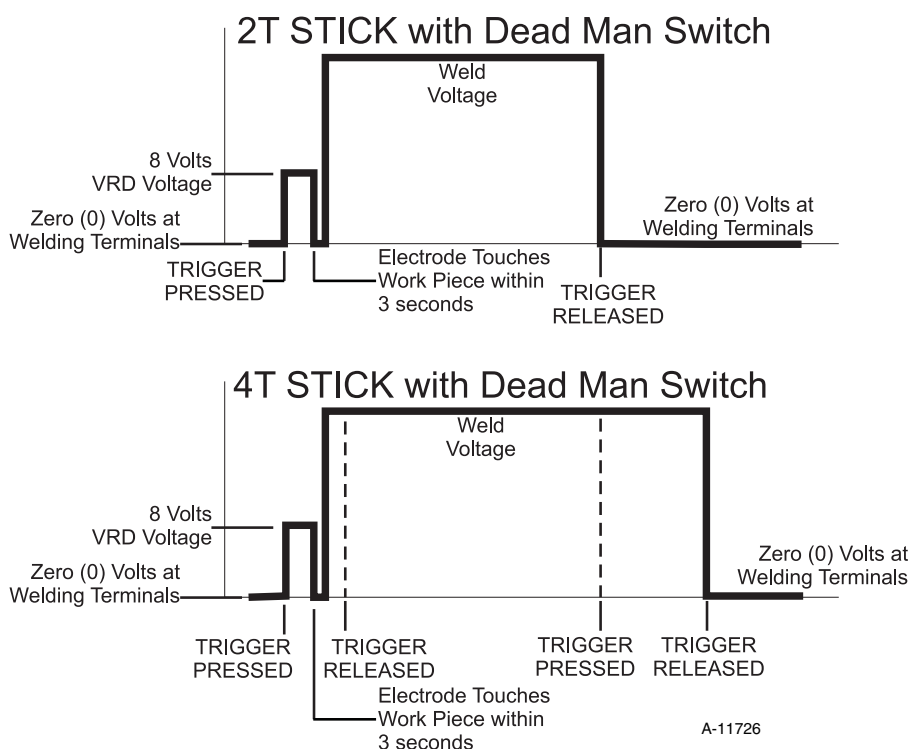
1. Press the trigger on the electrode holder.
2. The Power Source will now output the VRD volts and the VRD ON led will be lit.
3. Touch the Stick Electrode to the work and commence welding as usual.

4. Release the trigger to cease welding.

There will be 0V on the Power Source welding terminals and both VRD lights will be off.

#### 4T MODE

1. Press the trigger on the electrode holder.
2. The Power Source will now output the VRD volts and the VRD ON led will be lit.
3. Touch the Stick Electrode to the work and commence welding as usual.
4. Release the trigger and continue welding.
5. Press and release the trigger to cease welding.



There will be 0V on the Power Source welding terminals and both VRD lights will be off.

In both 2T and 4T modes, if the stick electrode is not touched to the work piece within three seconds, the welding output will be inhibited. Release the trigger to reset, and press the trigger again to reactivate the VRD.

Note that if the Dead Man Switch function is disabled, 2T and 4T are not available in STICK mode.

Information on how to disable the Dead Man Switch function is available from Cigweld Technical Customer Care on +61 3 9474 7400



**WARNING**

*Approval from a mine site manager, or work site manager must be obtained in writing before the Dead Man Switch function is disabled. Only a suitably qualified electrical tradesperson or Cigweld Service Provider should make any changes to the Power Source.*



**WARNING**

*The Power Source must be turned off and unplugged from the mains supply before the Dead Man Switch function is changed.*



## WARNING

*If 4T operation is selected when using the Dead man Switch mode, the use of an observer is recommended.*

### 10. Process Selection Control

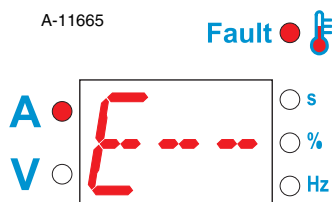
The process selection control is used to select the desired welding mode. Two modes are available, GTAW (Lift TIG) and MMAW (Stick) modes. Refer to section 3.08 for GTAW (TIG) set-up details or section 3.09 for MMAW (stick) set-up details.

Note that when the unit is powered on the mode selection control will automatically default to LIFT TIG mode. This is necessary so as to prevent inadvertent arcing should an electrode holder be connected to the unit and mistakenly be in contact with the work piece during power up.

### 11. Thermal Overload Indicator

This welding power source is protected by a self resetting thermostat. The indicator will illuminate if the duty cycle of the power source has been exceeded. Should the thermal overload indicator illuminate the output of the power source will be disabled. Once the power source cools down this light will go OFF and the over temperature condition will automatically reset. Note that the mains power switch should remain in the on position such that the fan continues to operate thus allowing the unit to cool sufficiently. Do not switch the unit off should a thermal overload condition be present.

The display will also show error code E-- in the event of an over current or over temperature.



### 12. Shielding Gas Inlet

The Shielding Gas Inlet connection is used to supply the appropriate shielding gas to the unit. Refer to section 3.08 for GTAW (TIG) set up details.



## WARNING

*Only Inert Shielding Gases specifically designed for welding applications should be used.*

### 13. On / Off Switch

This switch is used to turn the unit on/off.

### 14. Fan on Demand

The Transarc170i is fitted with a fan on demand feature. Fan on demand automatically switches the cooling fan off when it is not required. This has two main advantages; (1) to minimize power consumption, and (2) to minimize the amount of contaminants such as dust that are drawn into the power source.

Note that the fan will only operate when required for cooling purposes and will automatically switch off when not required.

### 3.07 Shielding Gas Regulator Operating Instructions (where supplied)



#### WARNING

*This equipment is designed for use with welding grade (Inert) shielding gases only.*

#### Shielding Gas Regulator Safety

This regulator is designed to reduce and control high pressure gas from a cylinder or pipeline to the working pressure required for the equipment using it.

If the equipment is improperly used, hazardous conditions are created that may cause accidents. It is the users responsibility to prevent such conditions. Before handling or using the equipment, understand and comply at all times with the safe practices prescribed in this instruction.

SPECIFIC PROCEDURES for the use of regulators are listed below.

1. NEVER subject the regulator to inlet pressure greater than its rated inlet pressure.
2. NEVER pressurize a regulator that has loose or damaged parts or is in a questionable condition. NEVER loosen a connection or attempt to remove any part of a regulator until the gas pressure has been relieved. Under pressure, gas can dangerously propel a loose part.
3. DO NOT remove the regulator from a cylinder without first closing the cylinder valve and releasing gas in the regulator high and low pressure chambers.
4. DO NOT use the regulator as a control valve. When downstream equipment is not in use for extended periods of time, shut off the gas at the cylinder valve and release the gas from the equipment.
5. OPEN the cylinder valve SLOWLY. Close after use.

#### User Responsibilities

This equipment will perform safely and reliable only when installed, operated and maintained, and repaired in accordance with the instructions provided. Equipment must be checked periodically and repaired, replaced, or reset as necessary for continued safe and reliable performance. Defective equipment should not be used. Parts that are broken, missing, obviously worn, distorted, or contaminated should be replaced immediately.

The user of this equipment will generally have the sole responsibility for any malfunction, which results from improper use, faulty maintenance, or by repair by anyone other than an accredited repairer.



#### CAUTION

*Match regulator to cylinder. NEVER CONNECT a regulator designed for a particular gas or gases to a cylinder containing any other gas.*

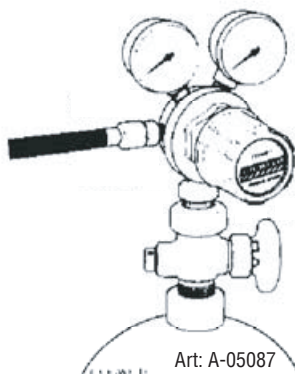


Figure 3-5: Fit Regulator to Cylinder



## Installation

1. Remove cylinder valve plastic dust seal. Clean the cylinder valve outlet of impurities that may clog orifices and damage seats before connecting the regulator.  
  
Crack the valve (open then close) momentarily, pointing the outlet away from people and sources of ignition. Wipe with a clean lint free cloth.
2. Match regulator to cylinder. Before connecting, check that the regulator label and cylinder marking agree and that the regulator inlet and cylinder outlet match. NEVER CONNECT a regulator designed for a particular gas or gases to a cylinder containing any other gas.
3. Connect the regulator inlet connection to cylinder or pipeline and tighten it firmly but not excessively, with a suitable spanner.
4. Connect and tighten the outlet hose firmly and attach down-stream equipment.
5. To protect sensitive down-stream equipment a separate safety device may be necessary if the regulator is not fitted with a pressure relief device.

## Operation

With the regulator connected to cylinder or pipeline, and the adjustment screw/knob fully disengaged, pressurize as follows:

1. Stand to one side of regulator and slowly open the cylinder valve. If opened quickly, a sudden pressure surge may damage internal regulator parts.
2. With valves on downstream equipment closed, adjust regulator to approximate working pressure. It is recommended that testing for leaks at the regulator connection points be carried out using a suitable leak detection solution or soapy water.
3. Purge air or other unwanted welding grade shielding gas from equipment connected to the regulator by individually opening then closing the equipment control valves. Complete purging may take up to ten seconds or more, depending upon the length and size of the hose being purged.

## Adjusting Flow Rate

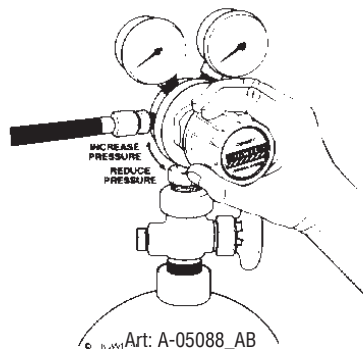


Figure 3-6: Adjust Flow Rate

With the regulator ready for operation, adjust working flow rate as follows:

1. Slowly turn adjusting screw/knob in (clockwise) direction until the outlet gauge indicates the required flow rate.

### NOTE

*It may be necessary to re-check the shielding gas regulator flow rate following the first weld sequence due to back pressure present within shielding gas hose assembly.*

2. To reduce flow rate, allow the welding grade shielding gas to discharge from regulator by opening the downstream valve. Bleed welding grade shielding gas into a well ventilated area and away from any ignition source. Turn adjusting screw counterclockwise, until the required flow rate is indicated on the gauge. Close downstream valve.



## Shutdown

Close cylinder valve whenever the regulator is not in use. To shut down for extended periods (more than 30 minutes).

1. Close cylinder or upstream valve tightly.
2. Open downstream equipment valves to drain the lines. Bleed gas into a well ventilated area and away from any ignition source.
3. After gas is drained completely, disengage adjusting screw and close downstream equipment valves.
4. Before transporting cylinders that are not secured on a cart designed for such purposes, remove regulators.

## 3.08 Setup for TIG (GTAW) Welding

- A. Select Lift TIG mode with the process selection control (refer to Section 3.06.10 for further information).
- B. Connect the TIG Torch to the negative welding terminal (-). Welding current flows from the power source via heavy duty bayonet type terminals. It is essential, however, that the male plug is inserted and turned securely to achieve a sound electrical connection.
- C. Connect the work lead to the positive welding terminal (+). Welding current flows from the Power Source via heavy duty bayonet type terminals. It is essential, however, that the male plug is inserted and turned securely to achieve a sound electrical connection.
- D. Connect the TIG torch trigger switch via the 8 pin socket located on the front of the power source as shown below. The TIG torch will require a trigger switch to operate in Lift TIG Mode.

### NOTE

*If the TIG torch has a remote TIG torch current control fitted then it will require to be connected to the 8 pin socket. (Refer to section 3.06.07 Remote Control Socket for further information).*

- E. Fit the welding grade shielding gas regulator/flowmeter to the shielding gas cylinder (refer to Section 3.07) then connect the shielding gas hose from the Power Source to the regulator/flowmeter outlet.



### WARNING

*Before connecting the work clamp to the work and inserting the electrode in the TIG Torch make sure the mains power supply is switched off.*

*Secure the welding grade shielding gas cylinder in an upright position by chaining it to a stationary support to prevent falling or tipping.*



### CAUTION

*Remove any packaging material prior to use. Do not block the air vents at the front or rear of the Welding Power Source.*

*Loose welding terminal connections can cause overheating and result in the male plug being fused in the terminal.*

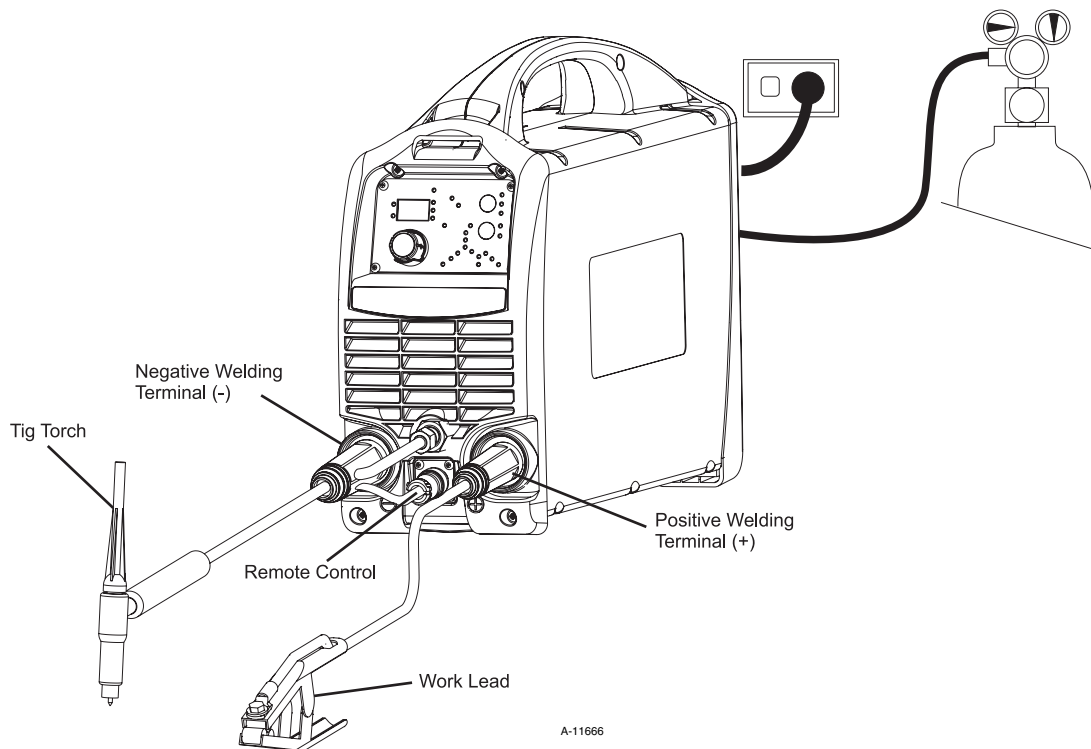


Figure 3-7: Setup for TIG Welding

## 3.09 Foot Control Part No. W4015800 (Optional Accessory)

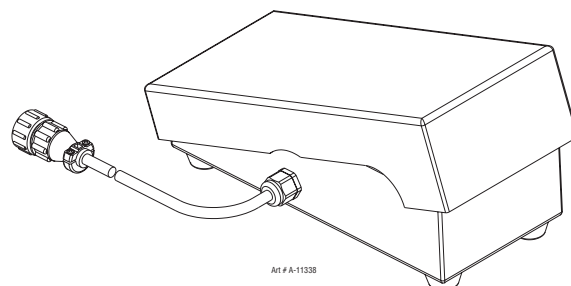


Figure 3-8: Foot Control

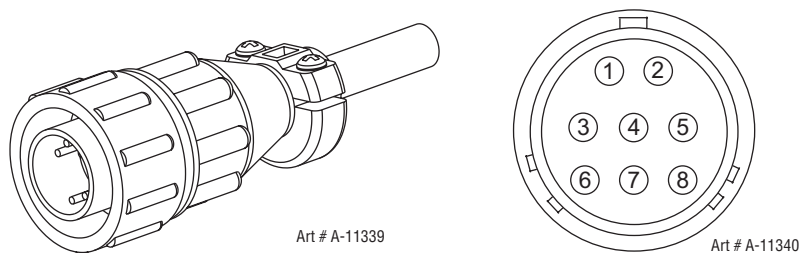


Figure 3-9: 8 Pin Control Plug

| Pin | Description           |
|-----|-----------------------|
| 1   | Not Used              |
| 2   | Trigger Switch        |
| 3   | Trigger Switch        |
| 4   | Not Used              |
| 5   | Potentiometer Maximum |
| 6   | Potentiometer Minimum |
| 7   | Potentiometer Wiper   |
| 8   | Not Used              |

Table 3-2

### Description

The CIGWELD Foot Control is a foot operated switch and potentiometer which starts and stops the welding process and controls welding current through operation of the foot pedal. Refer to list below for compatible Cigweld power sources.

### Installation

Attach the 8-pin connector on the end of the cable to the 8-pin receptacle on the front of the welding machine. To complete the connection, align the keyway, insert the plug, and rotate the threaded collar fully clockwise.

### Foot Control Operation

Press the foot pedal to start the machine output functions. The foot control potentiometer controls the welding current up to the level set on the welding power source. Note that the maximum current must be set on the power source by the operator **prior** to the foot control being connected, although this can be adjusted while you are welding.

With the foot control connected, the power source will only display minimum preview Amps until the foot control is depressed then it displays actual welding current when welding. Pressing the pedal to increases the welding current; letting up on the pedal decreases the welding current. Releasing the pedal completely extinguishes the arc and initiates the post-flow shielding gas timer (where fitted).

Note that some power sources may require the remote/local switch set to remote, the maximum setting of the power source will be determined by the respective front panel control, irrespective of the remote control device setting. As an example, if the output current on the power source front panel is set to 50% of the available current and the remote control device is set to 100% output or maximum, the maximum achievable output from the unit will be 50%. Should 100% output be required, the respective front panel control must be set to 100% or maximum, in which case the remote device will then be able to control between 1-100% output.

Note: The foot control will only work correctly when power source trigger mode 2T (Normal) is selected.

### 3.10 Setup for Manual Arc (MMAW) Welding

- A. Connect the Electrode Holder lead to the positive welding terminal (+). If in doubt, consult the electrode manufacturer. Welding current flows from the Power Source via heavy duty bayonet type terminals. It is essential, however, that the male plug is inserted and turned securely to achieve a sound electrical connection.
- B. Connect the work lead to the negative welding terminal (-). If in doubt, consult the electrode manufacturer. Welding current flows from the power source via heavy duty bayonet type terminals. It is essential, however, that the male plug is inserted and turned securely to achieve a sound electrical connection.



#### WARNING

*Before connecting the work clamp to the work and inserting the electrode in the electrode holder make sure the mains power supply is switched off.*



#### CAUTION

*Remove any packaging material prior to use. Do not block the air vents at the front or rear of the Welding Power Source.*

*Loose welding terminal connections can cause overheating and result in the male plug being fused.*

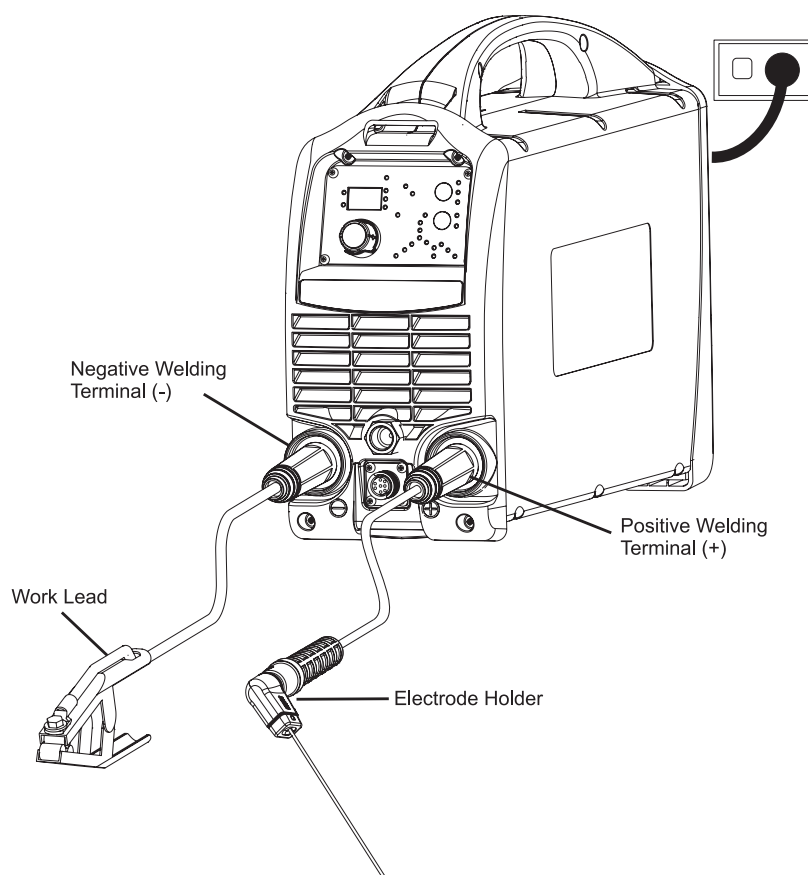


Figure 3-10: Setup for Manual Arc Welding

## SECTION 4: BASIC WELDING GUIDE

### 4.01 Stick (MMAW) Basic Welding Technique

#### Size of Electrode

The electrode size is determined by the thickness of metals being joined and can also be governed by the type of welding machine available. Small welding machines will only provide sufficient current (amperage) to run the smaller size electrodes.

For thin sections, it is necessary to use smaller electrodes otherwise the arc may burn holes through the job. A little practice will soon establish the most suitable electrode for a given application.

#### Storage of Electrodes

Always store electrodes in a dry place and in their original containers.

#### Electrode Polarity

Electrodes are generally connected to the ELECTRODE HOLDER with the Electrode Holder connected positive polarity. The WORK LEAD is connected negative polarity and is connected to the work piece. If in doubt consult the electrode data sheet or your nearest Accredited CIGWELD Distributor.

#### Effects of Arc Welding Various Materials

##### A. High tensile and alloy steels

The two most prominent effects of welding these steels are the formation of a hardened zone in the weld area, and, if suitable precautions are not taken, the occurrence in this zone of under-bead cracks may result. Hardened zone and under-bead cracks in the weld area may be reduced by using the correct electrodes, preheating, using higher current settings, using larger electrodes sizes, short runs for larger electrode deposits or tempering in a furnace.

Hydrogen controlled Electrodes must be used for this application. Use Ferrocrafter 61 or 16TXP for normal strength (500 MPa) steels, and Alloycraft range for higher strength steels.

##### B. Austenitic manganese steels

The effect on manganese steel of slow cooling from high temperatures is to embrittle it. For this reason it is absolutely essential to keep manganese steel cool during welding by quenching after each weld or skip welding to distribute the heat. Suitable Electrode types are Cobalarc Austex or Cobalarc Mangcraft.

##### C. Cast Iron

Most types of cast iron, except white iron, are weldable. White iron, because of its extreme brittleness, generally cracks when attempts are made to weld it. Trouble may also be experienced when welding white-heart malleable, due to the porosity caused by gas held in this type of iron. Suitable Electrode types are Castcraft 55 or Castcraft 100.

##### D. Copper and alloys

The most important factor is the high rate of heat conductivity of copper, making preheating of heavy sections necessary to give proper fusion of weld and base metal. Suitable Electrode types are Bronzecraft AC-DC electrodes.

#### Arc Welding Practice

The techniques used for arc welding are almost identical regardless of what types of metals are being joined. Naturally enough, different types of electrodes would be used for different metals as described in the preceding section.

## Welding Position

The electrodes dealt with in this publication can be used in most positions, i.e. they are suitable for welding in flat, horizontal, vertical and overhead positions. Numerous applications call for welds to be made in positions intermediate between these. Some of the common types of welds are shown in Figures 4-1 through 4-8.

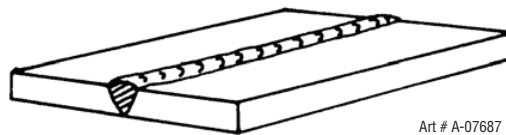


Figure 4-1: Flat Position, Down Hand Butt Weld

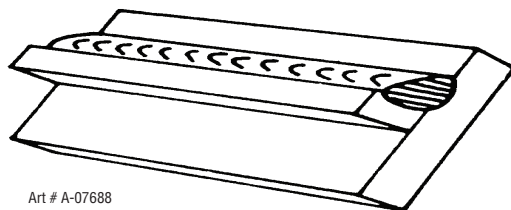


Figure 4-2: Flat Position, Gravity Fillet Weld

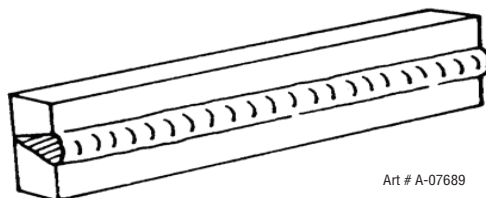


Figure 4-3: Horizontal Position, Butt Weld

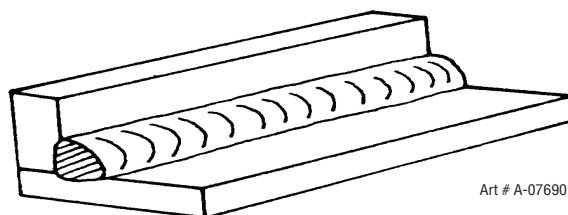


Figure 4-4: Horizontal-Vertical (HV) Position

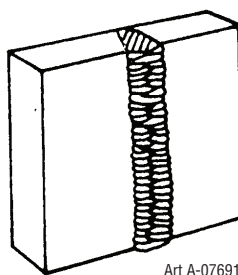


Figure 4-5: Vertical Position, Butt Weld

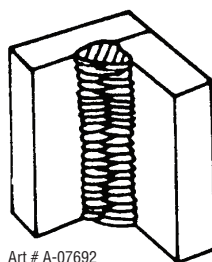
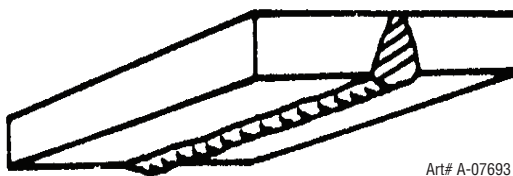
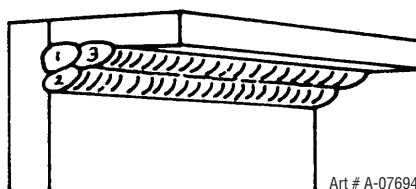


Figure 4-6: Vertical Position, Fillet Weld



Art# A-07693

Figure 4-7: Overhead Position, Butt Weld



Art # A-07694

Figure 4-8: Overhead Position, Fillet Weld

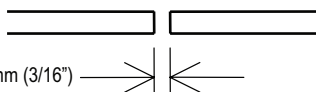
### Joint Preparations

In many cases, it will be possible to weld steel sections without any special preparation. For heavier sections and for repair work on castings, etc., it will be necessary to cut or grind an angle between the pieces being joined to ensure proper penetration of the weld metal and to produce sound joints.

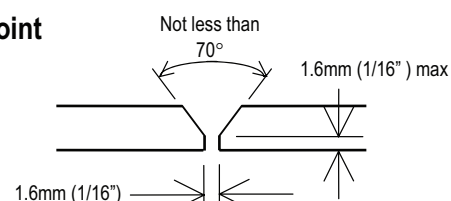
In general, surfaces being welded should be clean and free of rust, scale, dirt, grease, etc. Slag should be removed from oxy-cut surfaces. Typical joint designs are shown in Figure 4-9.

#### Open Square Butt Joint

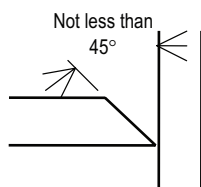
Gap varies from  
1.6mm (1/16") to 4.8mm (3/16")  
depending on plate thickness



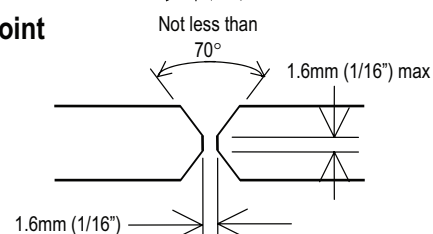
#### Single Vee Butt Joint



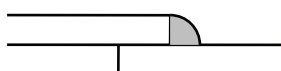
#### Single Vee Butt Joint



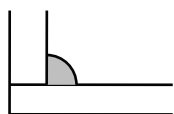
#### Double Vee Butt Joint



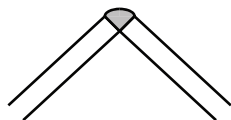
#### Lap Joint



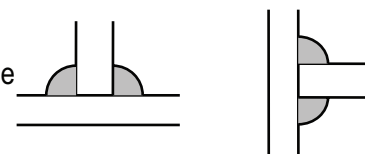
#### Fillet Joint



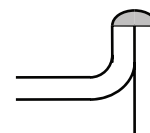
#### Corner Weld



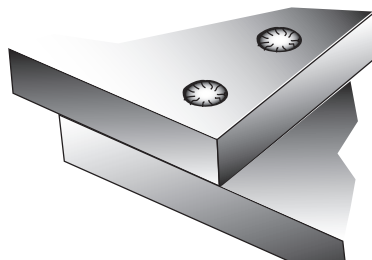
#### Tee Joints (Fillet both sides of the joint)



#### Edge Joint



#### Plug Weld



Art # A-07695\_AE

#### Plug Weld

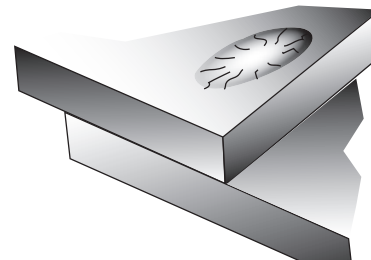


Figure 4-9: Typical Joint Designs for Arc Welding

## Arc Welding Technique - A Word to Beginners

For those who have not yet done any welding, the simplest way to commence is to run beads on a piece of scrap plate. Use mild steel plate about 6.0mm thick and a 3.2mm electrode. Clean any paint, loose scale or grease off the plate and set it firmly on the work bench so that welding can be carried out in the downhand position. Make sure that the work clamp is making good electrical contact with the work, either directly or through the work table. For light gauge material, always clamp the work lead directly to the job, otherwise a poor circuit will probably result.

### The Welder

Place yourself in a comfortable position before beginning to weld. Get a seat of suitable height and do as much work as possible sitting down. Don't hold your body tense. A taut attitude of mind and a tensed body will soon make you feel tired. Relax and you will find that the job becomes much easier. You can add much to your peace of mind by wearing a leather apron and gauntlets. You won't be worrying then about being burnt or sparks setting alight to your clothes.

Place the work so that the direction of welding is across, rather than to or from, your body. The electrode holder lead should be clear of any obstruction so that you can move your arm freely along as the electrode burns down. If the lead is slung over your shoulder, it allows greater freedom of movement and takes a lot of weight off your hand. Be sure the insulation on your cable and electrode holder is not faulty, otherwise you are risking an electric shock.

### Striking the Arc

Practice this on a piece of scrap plate before going on to more exacting work. You may at first experience difficulty due to the tip of the electrode "sticking" to the work piece. This is caused by making too heavy a contact with the work and failing to withdraw the electrode quickly enough. A low amperage will accentuate it. This freezing-on of the tip may be overcome by scratching the electrode along the plate surface in the same way as a match is struck. As soon as the arc is established, maintain a 1.6mm to 3.2mm gap between the burning electrode end and the parent metal. Draw the electrode slowly along as it melts down.

Another difficulty you may meet is the tendency, after the arc is struck, to withdraw the electrode so far that the arc is broken again. A little practice will soon remedy both of these faults.

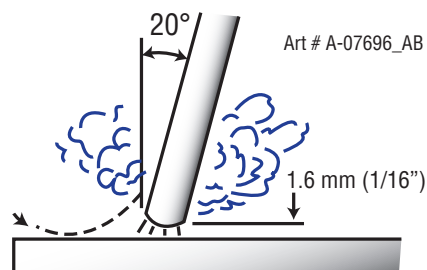


Figure 4-10: Striking an Arc

### Arc Length

The securing of an arc length necessary to produce a neat weld soon becomes almost automatic. You will find that a long arc produces more heat. A very long arc produces a crackling or spluttering noise and the weld metal comes across in large, irregular blobs. The weld bead is flattened and spatter increases. A short arc is essential if a high quality weld is to be obtained although if it is too short there is the danger of it being blanketed by slag and the electrode tip being solidified in. If this should happen, give the electrode a quick twist back over the weld to detach it. Contact or "touch-weld" electrodes such as Ferrocraft 21 do not stick in this way, and make welding much easier.

### Rate of Travel

After the arc is struck, your next concern is to maintain it, and this requires moving the electrode tip towards the molten pool at the same rate as it is melting away. At the same time, the electrode has to move along the plate to form a bead. The electrode is directed at the weld pool at about 20° from the vertical. The rate of travel has to be adjusted so that a well-formed bead is produced.



If the travel is too fast, the bead will be narrow and strung out and may even be broken up into individual globules. If the travel is too slow, the weld metal piles up and the bead will be too large.

## Making Welded Joints

Having attained some skill in the handling of an electrode, you will be ready to go on to make up welded joints.

### A. Butt Welds

Set up two plates with their edges parallel, as shown in Figure 4-11, allowing 1.6mm to 2.4mm gap between them and tack weld at both ends. This is to prevent contraction stresses from the cooling weld metal pulling the plates out of alignment. Plates thicker than 6.0mm should have their mating edges bevelled to form a 70° to 90° included angle. This allows full penetration of the weld metal to the root. Using a 3.2mm Ferrocrafter 21 electrode at 100 amps, deposit a run of weld metal on the bottom of the joint.

Do not weave the electrode, but maintain a steady rate of travel along the joint sufficient to produce a well-formed bead. At first you may notice a tendency for undercut to form, but keeping the arc length short, the angle of the electrode at about 20° from vertical, and the rate of travel not too fast, will help eliminate this. The electrode needs to be moved along fast enough to prevent the slag pool from getting ahead of the arc. To complete the joint in thin plate, turn the job over, clean the slag out of the back and deposit a similar weld.

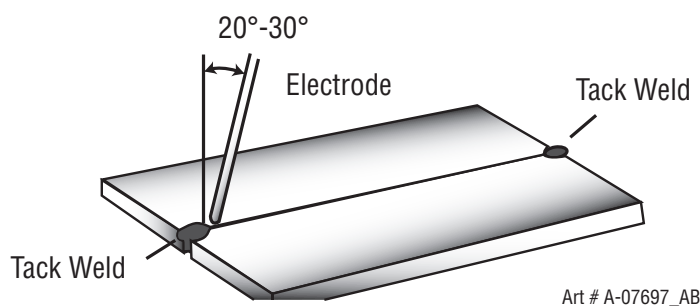


Figure 4-11: Butt Weld

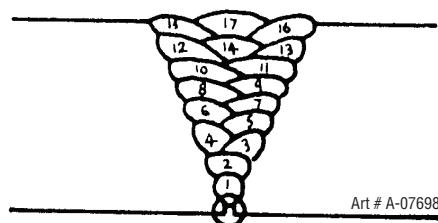


Figure 4-12: Weld Build up Sequence

Heavy plate will require several runs to complete the joint. After completing the first run, chip the slag out and clean the weld with a wire brush. It is important to do this to prevent slag being trapped by the second run. Subsequent runs are then deposited using either a weave technique or single beads laid down in the sequence shown in Figure 4-12. The width of weave should not be more than three times the core wire diameter of the electrode. When the joint is completely filled, the back is either machined, ground or gouged out to remove slag which may be trapped in the root, and to prepare a suitable joint for depositing the backing run. If a backing bar is used, it is not usually necessary to remove this, since it serves a similar purpose to the backing run in securing proper fusion at the root of the weld.

### B. Fillet Welds

These are welds of approximately triangular cross-section made by depositing metal in the corner of two faces meeting at right angles. Refer to Figure 4-4.

A piece of angle iron is a suitable specimen with which to begin, or two lengths of strip steel may be tacked together at right angles. Using a 3.2mm Ferrocrafter 21 electrode at 100 amps, position angle iron with one leg horizontal and the other vertical. This is known as a horizontal-vertical (HV) fillet. Strike the arc and immediately bring the electrode to a position perpendicular to the line of the fillet and about 45° from the vertical. Some electrodes require to be sloped about 20° away from the perpendicular position

to prevent slag from running ahead of the weld. Refer to Figure 4-13. Do not attempt to build up much larger than 6.4mm width with a 3.2mm electrode, otherwise the weld metal tends to sag towards the base, and undercut forms on the vertical leg. Multi-runs can be made as shown in Figure 4-14. Weaving in HV fillet welds is undesirable.

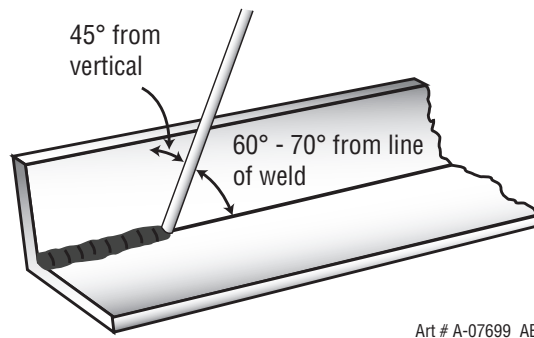


Figure 4-13: Electrode Position for HV Fillet Weld

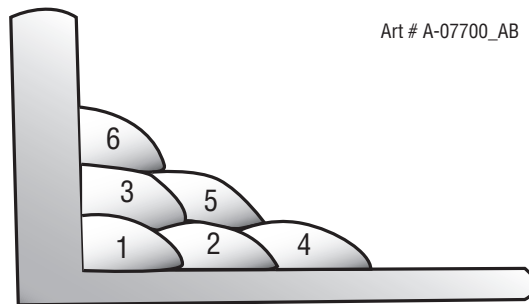


Figure 4-14: Multi-runs in HV Fillet Weld

### C. Vertical Welds

#### 1. Vertical Up

Tack weld a three feet length of angle iron to your work bench in an upright position. Use a 3.2mm Ferrocrafter 21 electrode and set the current at 100 amps. Make yourself comfortable on a seat in front of the job and strike the arc in the corner of the fillet. The electrode needs to be about 10° from the horizontal to enable a good bead to be deposited. Refer Figure 4-15. Use a short arc, and do not attempt to weave on the first run. When the first run has been completed de-slag the weld deposit and begin the second run at the bottom. This time a slight weaving motion is necessary to cover the first run and obtain good fusion at the edges. At the completion of each side motion, pause for a moment to allow weld metal to build up at the edges, otherwise undercut will form and too much metal will accumulate in the centre of the weld. Figure 4-16 illustrates multi-run technique and Figure 4-17 shows the effects of pausing at the edge of weave and of weaving too rapidly.

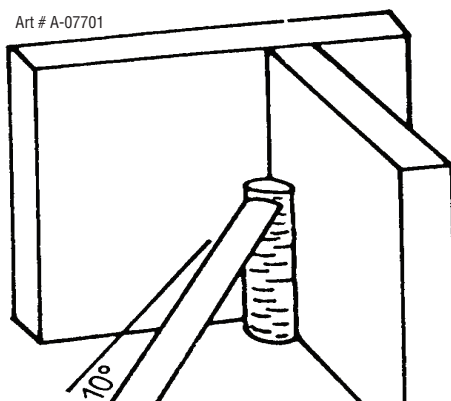


Figure 4-15: Single Run Vertical Fillet Weld

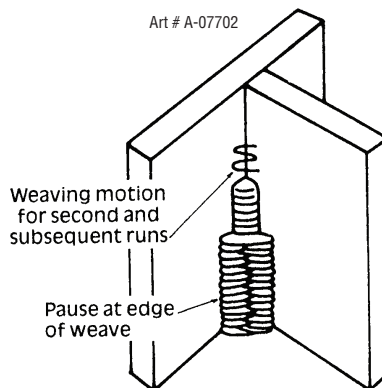


Figure 4-16: Multi Run Vertical Fillet Weld

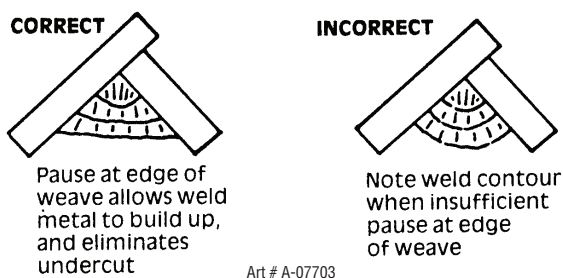


Figure 4-17: Examples of Vertical Fillet Welds

## 2. Vertical Down

The Ferrocraft 21 electrode makes welding in this position particularly easy. Use a 3.2mm electrode at 100 amps. The tip of the electrode is held in light contact with the work and the speed of downward travel is regulated so that the tip of the electrode just keeps ahead of the slag. The electrode should point upwards at an angle of about  $45^\circ$ .

## 3. Overhead Welds

Apart from the rather awkward position necessary, overhead welding is not much more difficult than downhand welding. Set up a specimen for overhead welding by first tacking a length of angle iron at right angles to another piece of angle iron or a length of waste pipe. Then tack this to the work bench or hold in a vice so that the specimen is positioned in the overhead position as shown in the sketch. The electrode is held at  $45^\circ$  to the horizontal and tilted  $10^\circ$  in the line of travel (Figure 4-18). The tip of the electrode may be touched lightly on the metal, which helps to give a steady run. A weave technique is not advisable for overhead fillet welds. Use a 3.2mm Ferrocraft 12XP electrode at 100 amps, and deposit the first run by simply drawing the electrode along at a steady rate. You will notice that the weld deposit is rather convex, due to the effect of gravity before the metal freezes.

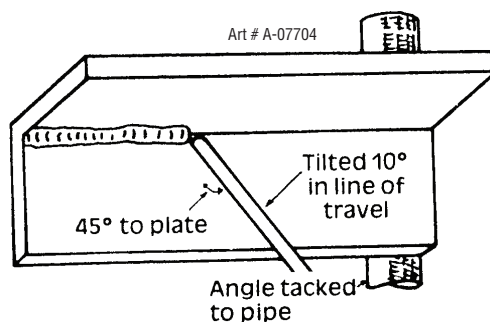


Figure 4-18: Overhead Fillet Weld

**Distortion**

Distortion in some degree is present in all forms of welding. In many cases it is so small that it is barely perceptible, but in other cases allowance has to be made before welding commences for the distortion that will subsequently occur. The study of distortion is so complex that only a brief outline can be attempted here.

**The Cause of Distortion**

Distortion is caused by:

**A. Contraction of Weld Metal:**

Molten steel shrinks approximately 11 per cent in volume on cooling to room temperature. This means that a cube of molten metal would contract approximately 2.2 per cent in each of its three dimensions. In a welded joint, the metal becomes attached to the side of the joint and cannot contract freely. Therefore, cooling causes the weld metal to flow plastically, that is, the weld itself has to stretch if it is to overcome the effect of shrinking volume and still be attached to the edge of the joint. If the restraint is very great, as, for example, in a heavy section of plate, the weld metal may crack. Even in cases where the weld metal does not crack, there will still remain stresses "Locked-up" in the structure. If the joint material is relatively weak, for example, a butt joint in 2.0mm sheet, the contracting weld metal may cause the sheet to become distorted.

**B. Expansion and Contraction of Parent Metal in the Fusion Zone:**

While welding is proceeding, a relatively small volume of the adjacent plate material is heated to a very high temperature and attempts to expand in all directions. It is able to do this freely at right angles to the surface of the plate (i.e., "through the weld", but when it attempts to expand "across the weld" or "along the weld", it meets considerable resistance, and to fulfil the desire for continued expansion, it has to deform plastically, that is, the metal adjacent to the weld is at a high temperature and hence rather soft, and, by expanding, pushes against the cooler, harder metal further away, and tends to bulge (or is "upset". When the weld area begins to cool, the "upset" metal attempts to contract as much as it expanded, but, because it has been "upset" it does not resume its former shape, and the contraction of the new shape exerts a strong pull on adjacent metal. Several things can then happen.

The metal in the weld area is stretched (plastic deformation), the job may be pulled out of shape by the powerful contraction stresses (distortion), or the weld may crack, in any case, there will remain "locked-up" stresses in the job. Figures 4-19 and 4- 20 illustrate how distortion is created.

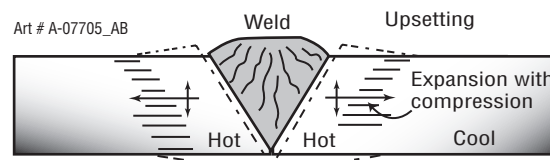


Figure 4-19: Parent Metal Expansion

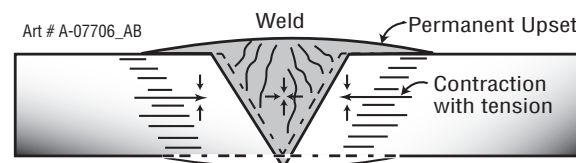


Figure 4-20: Parent Metal Contraction

**Overcoming Distortion Effects**

There are several methods of minimizing distortion effects.

**A. Peening**

This is done by hammering the weld while it is still hot. The weld metal is flattened slightly and because of this the tensile stresses are reduced a little. The effect of peening is relatively shallow, and is not advisable on the last layer.

## B. Distribution of Stresses

Distortion may be reduced by selecting a welding sequence which will distribute the stresses suitably so that they tend to cancel each other out. See Figures 4-20 through 4-23 for various weld sequences. Choice of a suitable weld sequence is probably the most effective method of overcoming distortion, although an unsuitable sequence may exaggerate it. Simultaneous welding of both sides of a joint by two welders is often successful in eliminating distortion.

## C. Restraint of Parts

Forcible restraint of the components being welded is often used to prevent distortion. Jigs, positions, and tack welds are methods employed with this in view.

## D. Presetting

It is possible in some cases to tell from past experience or to find by trial and error (or less frequently, to calculate) how much distortion will take place in a given welded structure. By correct pre-setting of the components to be welded, constructional stresses can be made to pull the parts into correct alignment. A simple example is shown in Figure 4-21.

## E. Preheating

Suitable preheating of parts of the structure other than the area to be welded can be sometimes used to reduce distortion. Figure 4-22 shows a simple application. By removing the heating source from b and c as soon as welding is completed, the sections b and c will contract at a similar rate, thus reducing distortion.

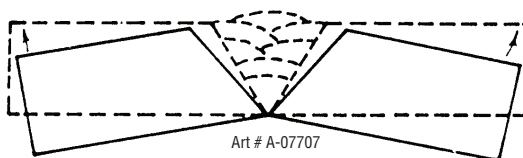
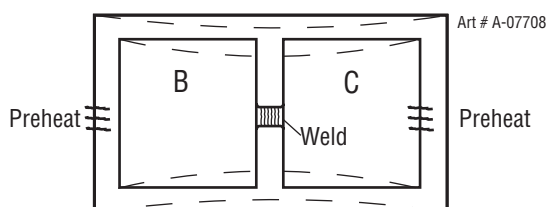


Figure 4-21: Principle of Presetting



Dotted lines show effect if no preheat is used

Figure 4-22: Reduction of Distortion by Preheating

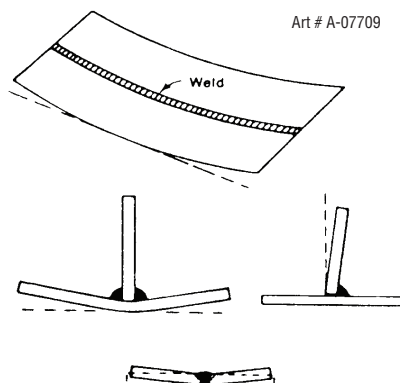


Figure 4-23: Examples of Distortion

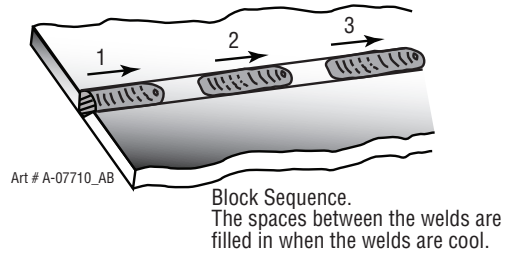


Figure 4-24: Welding Sequence

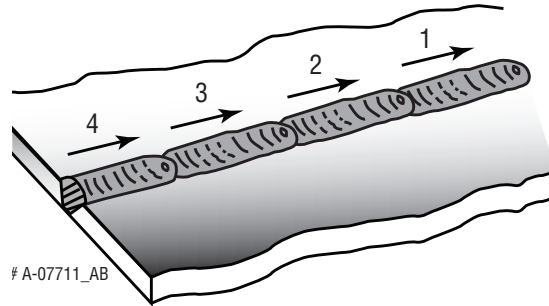


Figure 4-25: Step back Sequence

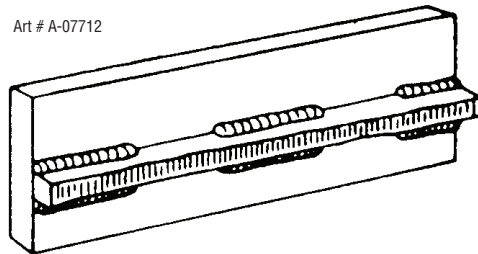


Figure 4-26: Chain Intermittent Welding

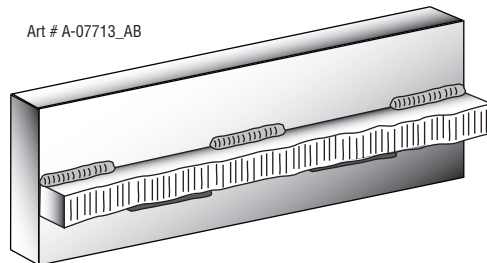


Figure 4-27: Staggered Intermittent Welding

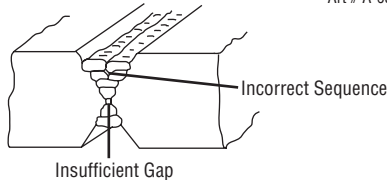
## Electrode Selection Chart

| CIGWELD Electrode Selection Chart |             |             |          |   |
|-----------------------------------|-------------|-------------|----------|---|
| Description                       | Diameter    | Pack        | Part No. | Application   |
| Satincraft 13                     | 2.5mm       | 1kg         | 322135   | General purpose electrode suitable for all positional welding and galvanised steel.   |
|                                   | 2.5mm       | 2.5kg       | 612182   |   |
|                                   | 3.2mm       | 1kg         | 322136   |   |
|                                   | 3.2mm       | 2.5kg       | 612183   |   |
|                                   | 4.0mm       | 5kg         | 611184   |   |
| Ferrocraft 12XP                   | 2.0mm       | 1kg         | 322128   | General purpose, extra performance electrode recommended for all positional (inc. Vertical down) welding of mild and galvanised steel.                          |
|                                   | 2.0mm       | 2.5kg       | 612231   |   |
|                                   | 2.5mm       | 1kg         | 322129   |   |
|                                   | 2.5mm       | 2.5kg       | 612232   |   |
|                                   | 3.2mm       | 1kg         | 322138   |   |
|                                   | 3.2mm       | 2.5kg       | 612233   |   |
|                                   | 4.0mm       | 5kg         | 611234   |   |
| WeldSkill GP                      | 2.0mm       | 1 kg        | WEG1020  | User-friendly GP electrode for welding thin section mild and galvanised steels. Excellent for vertical down fillet welding applications.                        |
|                                   | 2.0mm       | 2.5 kg      | WEG2520  |   |
|                                   | 2.5mm       | 1 kg        | WEG1025  |   |
|                                   | 2.5mm       | 2.5 kg      | WEG2525  |   |
|                                   | 2.5mm       | 5 kg        | WEG5025  |   |
|                                   | 3.2mm       | 1 kg        | WEG1032  |   |
|                                   | 3.2mm       | 2.5 kg      | WEG2532  |   |
|                                   | 3.2mm       | 5 kg        | WEG5032  |   |
|                                   | 4.0mm       | 5 kg        | WEG5040  |   |
| Ferrocraft 16 Twincoat            | 2.5mm       | 5 kg        | 611752   | Hydrogen Controlled type offering exceptional AC/DC performance in all welding positions.   |
|                                   | 3.2mm       | 5 kg        | 611753   |   |
|                                   | 4.0mm       | 5 kg        | 611754   |   |
| Satinchrome 308L-17               | 2.5mm       | 2.5 kg      | 611602   | Stainless Steel type for 19Cr/10Ni stainless grades including 201, 202, 301, 302, 303, 304, 304L, 305, 308, etc   |
|                                   | 3.2mm       | 2.5 kg      | 611603   |   |
|                                   | 4.0mm       | 2.5 kg      | 611604   |   |
| Satinchrome 309Mo-17              | 2.5mm       | 2.5 kg      | 611692   | Stainless Steel type for 309 and 309L grades. It is also suitable for welding of dissimilar welding of other 300 series stainless steels.                       |
|                                   | 3.2mm       | 2.5 kg      | 611693   |   |
|                                   | 4.0mm       | 2.5 kg      | 611694   |   |
| Satinchrome 316L-17               | 2.0mm       | 2.5 kg      | 611661   | Stainless Steel type for welding of matching Mo bearing grades, 316 and 316L.   |
|                                   | 2.5mm       | 2.5 kg      | 611662   |   |
|                                   | 3.2mm       | 2.5 kg      | 611663   |   |
|                                   | 2.5/3.2mm   | Blisterpack | 322215   |   |
|                                   | 4.0mm       | 2.5 kg      | 611664   |   |
| Weldall                           | 2.5mm       | 2.5 kg      | 611702   | High alloy stainless steel type for welding of unknown steels, repair of die or tool steels and for joining dissimilar steels. (Not recommended for cast iron). |
|                                   | 3.2mm       | 2.5 kg      | 611703   |   |
|                                   | 2.5/3.2mm   | Blisterpack | 322216   |   |
|                                   | 4.0mm       | 2.5 kg      | 611704   |   |
| Castcraft 55                      | 3.2mm       | 2.5 kg      | 611723   | For repair and maintenance welding of S.G. cast iron, meehanite and other cast irons. It produces high strength weld than Castcraft 100.                        |
|                                   | 4.0mm       | 2.5 kg      | 611724   |   |
| Castcraft 100                     | 2.5mm       | 2.5 kg      | 611732   | Soft, Ductile Nickel type electrode for repair and maintenance welding of a wide range of cast irons. It has better “wetting” action than Castcraft 55.         |
|                                   | 3.2mm       | 2.5 kg      | 611733   |   |
|                                   | Blisterpack | Blisterpack | 322217   |   |
|                                   | 4.0mm       | 2.5 kg      | 611734   |   |

Table 4-1: Cigweld Electrode Selection Chart

Further information on CIGWELD electrodes can be found at the website [www.cigweld.com.au](http://www.cigweld.com.au).

## 4.02 Stick (MMAW) Welding Troubleshooting

| FAULT  | CAUSE  | REMEDY   |
|--|--|--|
| 1 Welding current varying  | ARC FORCE is set at a value that causes the welding current to vary excessively with the arc length.   | Reduce the ARC FORCE until welding current is reasonably constant while prohibiting the electrode from sticking to the work piece when you “dig” the electrode into the workpiece.   |
| 2 A gap is left by failure of the weld metal to fill the root of the weld.   | A Welding current too low<br>B Electrode too large for joint.<br>C Insufficient gap.   | A Increase welding current.<br>B Use smaller diameter electrode.<br>C Allow wider gap.   |
| 3 Non-metallic particles are trapped in the weld metal.  | A Non-metallic particles may be trapped in undercut from previous run.<br>B Joint preparation too restricted.<br>C Irregular deposits allow slag to be trapped.<br>D Lack of penetration with slag trapped beneath weld bead.<br>E Rust or mill scale is preventing full fusion.<br>F Wrong electrode for position in which welding is done. | A If a bad undercut is present clean slag out and cover with a run from a smaller gauge electrode.<br>B Allow for adequate penetration and room for cleaning out the slag.<br>C If very bad, chip or grind out irregularities.<br>D Use smaller electrode with sufficient current to give adequate penetration. Use suitable tools to remove all slag from comers.<br>E Clean joint before welding.<br>F Use electrodes designed for position in which welding is done, otherwise proper control of slag is difficult. |
| <div style="text-align: center;"> <p>Art # A-05866_AC</p>  <p>Insufficient Gap</p> </div> <p style="text-align: center;">Figure 1-Example of insufficient gap or incorrect sequence</p> |  |  |
| 4 A groove has been formed in the base metal adjacent to the toe of a weld and has not been filled by the weld metal (undercut).   | A Welding current is too high.<br>B Welding arc is too long.<br>C Angle of the electrode is incorrect.<br>D Joint preparation does not allow correct electrode angle.<br>E Electrode too large for joint.<br>F Insufficient deposit time at edge of weave.   | A Reduce welding current.<br>B Reduce the length of the welding arc.<br>C Electrode should not be inclined less than 45° to the vertical face.<br>D Allow more room in joint for manipulation of the electrode.<br>E Use smaller gauge electrode.<br>F Pause for a moment at edge of weave to allow weld metal buildup.  |



|   |   |   |
|---|---|---|
| <p>5 Portions of the weld run do not fuse to the surface of the metal or edge of the joint.</p> | <p>A Small electrodes used on heavy cold plate.<br/>B Welding current is too low.<br/>C Wrong electrode angle.<br/>D Travel speed of electrode is too high.<br/>E Scale or dirt on joint surface.</p> | <p>A Use larger electrodes and preheat the plate.<br/>B Increase welding current.<br/>C Adjust angle so the welding arc is directed more into the base metal.<br/>D Reduce travel speed of electrode.<br/>E Clean surface before welding.</p> |
|---|---|---|

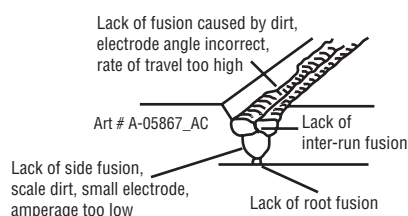


Figure 2: Example of Lack of Fusion

|  |   |   |
|--|---|---|
| <p>6 Gas pockets or voids in weld metal (porosity)</p>                     | <p>A High levels of sulphur in steel.<br/>B Electrodes are damp.<br/>C Welding current is too high.<br/>D Surface impurities such as oil, grease, paint, etc.<br/>E Welding in a windy environment.<br/>F Electrode damaged ie flux coating incomplete.</p> | <p>A Use an electrode that is designed for high sulphur steels.<br/>B Dry electrodes before use.<br/>C Reduce welding current.<br/>D Clean joint before welding.<br/>E Shield the weld area from the wind.<br/>F Discard damaged electrodes and only use electrodes with a complete flux coating.</p> |
| <p>7 Crack occurring in weld metal soon after solidification commences</p> | <p>A Rigidity of joint.<br/>B Insufficient throat thickness.<br/>C Weld current is too high.</p>  | <p>A Redesign to relieve weld joint of severe stresses or use crack resistance electrodes.<br/>B Travel slightly slower to allow greater build up in throat.<br/>C Decrease welding current.</p>  |

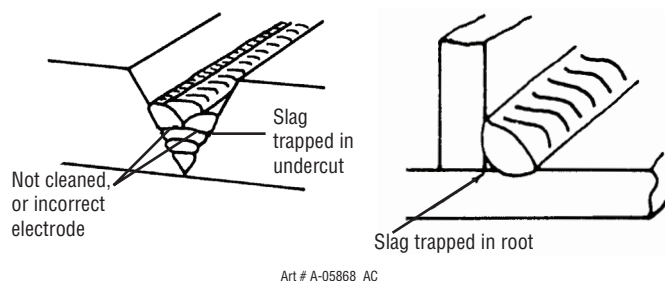


Figure 3: Example of Slag Inclusion

Table 4-2: Welding Problems MMAW (Stick)

4.03 TIG (GTAW) Basic Welding Technique

Gas Tungsten Arc Welding (GTAW) or TIG (Tungsten Inert Gas) as it is commonly referred to, is a welding process in which fusion is produced by an electric arc that is established between a single tungsten (non-consumable) electrode and the work piece. Shielding is obtained from a welding grade shielding gas or welding grade shielding gas mixture which is generally Argon based. A filler metal may also be added manually in some circumstances depending on the welding application.

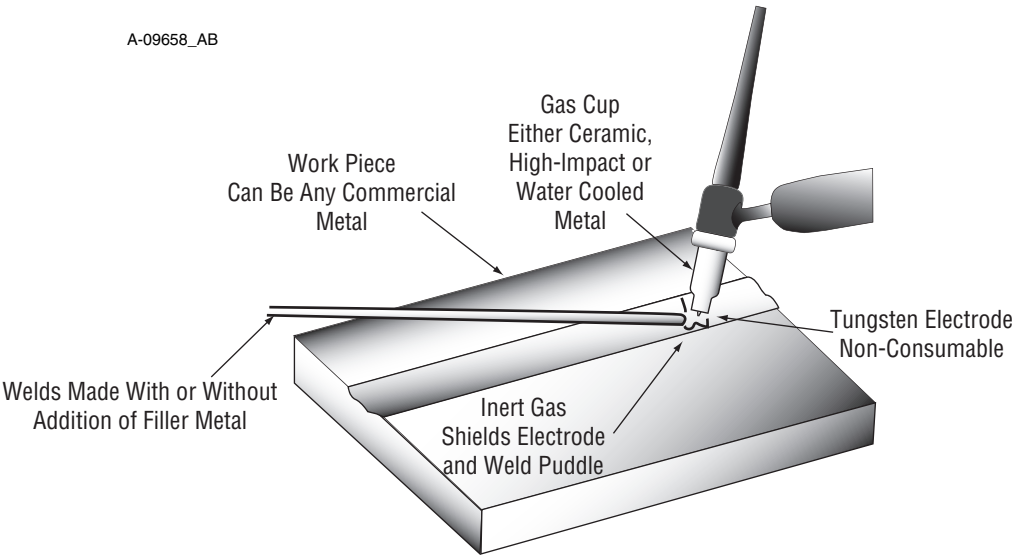


Figure 4-28: TIG Welding Application Shot

Tungsten Electrode Current Ranges

| Electrode Diameter | DC Current (Amps) |
|--------------------|-------------------|
| 0.040" (1.0mm)     | 30-60             |
| 1/16" (1.6mm)      | 60-115            |
| 3/32" (2.4mm)      | 100-165           |
| 1/8" (3.2mm)       | 135-200           |
| 5/32" (4.0mm)      | 190-280           |
| 3/16" (4.8mm)      | 250-340           |

Table 4-3: Current Ranges for Various Tungsten Electrode Sizes

Guide for Selecting Filler Wire Diameter

| Filler Wire Diameter | DC Current Range (Amps) |
|----------------------|-------------------------|
| 1/16" (1.6mm)        | 20-90                   |
| 3/32" (2.4mm)        | 65-115                  |
| 1/8" (3.2mm)         | 100-165                 |
| 3/16" (4.8mm)        | 200-350                 |

Table 4-4: Filler Wire Selection Guide

**Tungsten Electrode Types**

| <b>Electrode Type<br/>(Ground Finish)</b> | <b>Welding Application</b>  | <b>Features</b>   | <b>Colour Code</b> |
|---|---|---|--------------------|
| Thoriated 2%                              | DC welding of mild steel, stainless steel and copper  | Excellent arc starting, Long life, High current carrying capacity                                   | Red                |
| Zirconated 1%                             | High quality AC welding of aluminium, magnesium and their alloys.                             | Self cleaning, Long life, Maintains balled end, High current carrying capacity.                     | White              |
| Ceriated 2%                               | AC & DC welding of mild steel, stainless steel, copper, aluminium, magnesium and their alloys | Longer life, More stable arc, Easier starting, Wider current range, Narrower more concentrated arc. | Grey               |

Table 4-5

**TIG Welding Filler Rods**

| <b>Comweld Rod</b>         | <b>Aust Std</b>         | <b>AWS Std</b>                | <b>Part No.<br/>1.6mm</b>  | <b>Part No.<br/>2.4mm</b>  | <b>Part No.<br/>3.2mm</b> | <b>Type/Application</b>  |
|----------------------------|-------------------------|-------------------------------|----------------------------|----------------------------|---------------------------|--|
| LW1<br>LW1-6<br>Supersteel | R4<br>R6<br>R2          | ER70S-4<br>ER70S-6<br>ER70S-2 | 321411<br>321417<br>321370 | —<br>—<br>—                | —<br>—<br>—               | For mild-medium strength steels. Pipes, tubing, roll cages, etc.         |
| CrMo1<br>CrMo2             | RB2<br>RB3              | ER80S-B2<br>ER90S-B3          | —<br>—                     | 321379<br>321383           | —<br>—                    | For welding of high strength Cr-Mo steels used at elevated temperatures. |
| 308L<br>309L<br>316L       | R308L<br>R309L<br>R316L | ER308L<br>ER309L<br>ER316L    | 321406<br>321403<br>321400 | 321407<br>321404<br>321401 | —<br>—<br>—               | For stainless steels. Stainless pipes, tubing, architectural uses, etc.  |

Table 4-6

| <b>Base Metal Thickness</b> | <b>DC Current for Mild Steel</b> | <b>DC Current for Stainless Steel</b> | <b>Tungsten Electrode Diameter</b> | <b>Filler Rod Diameter (if required)</b> | <b>Argon Gas Flow Rate Litres/min</b> | <b>Joint Type</b>      |
|-----------------------------|----------------------------------|---------------------------------------|------------------------------------|--|---------------------------------------|------------------------|
| 0.040"<br>1.0mm             | 35-45<br>40-50                   | 20-30<br>25-35                        | 0.040"<br>1.0mm                    | 1/16"<br>1.6mm                           | 5-7                                   | Butt/Corner Lap/Fillet |
| 0.045"<br>1.2mm             | 45-55<br>50-60                   | 30-45<br>35-50                        | 0.040"<br>1.0mm                    | 1/16"<br>1.6mm                           | 5-7                                   | Butt/Corner Lap/Fillet |
| 1/16"<br>1.6mm              | 60-70<br>70-90                   | 40-60<br>50-70                        | 1/16"<br>1.6mm                     | 1/16"<br>1.6mm                           | 7                                     | Butt/Corner Lap/Fillet |
| 1/8"<br>3.2mm               | 80-100<br>90-115                 | 65-85<br>90-110                       | 1/16"<br>1.6mm                     | 3/32"<br>2.4mm                           | 7                                     | Butt/Corner Lap/Fillet |
| 3/16"<br>4.8mm              | 115-135<br>140-165               | 100-125<br>125-150                    | 3/32"<br>2.4mm                     | 1/8"<br>3.2mm                            | 10                                    | Butt/Corner Lap/Fillet |
| 1/4"<br>6.4mm               | 160-175<br>170-200               | 135-160<br>160-180                    | 1/8"<br>3.2mm                      | 5/32"<br>4.0mm                           | 10                                    | Butt/Corner Lap/Fillet |

Table 4-7

## TRANSARC 170i

TIG Welding is generally regarded as a specialised process that requires operator competency. While many of the principles outlined in the previous Arc Welding section are applicable a comprehensive outline of the TIG Welding process is outside the scope of this Operating Manual. For further information please refer to [www.cigweld.com.au](http://www.cigweld.com.au) or contact Cigweld.

### 4.04 TIG (GTAW) Welding Problems

| FAULT   | CAUSE  | REMEDY  |
|---|--|---|
| 1 Excessive bead build up or poor penetration or poor fusion at edges of weld.                | Welding current is too low   | Increase weld current and/or faulty joint preparation.  |
| 2 Weld bead too wide and flat or undercut at edges of weld or excessive burn through.         | Welding current is too high  | Decrease weld current.  |
| 3 Weld bead too small or insufficient penetration or ripples in bead are widely spaced apart. | Travel speed too fast  | Reduce travel speed.  |
| 4 Weld bead too wide or excessive bead build up or excessive penetration in butt joint.       | Travel speed too slow  | Increase travel speed.  |
| 5 Uneven leg length in fillet joint   | Wrong placement of filler rod  | Re-position filler rod.   |
| 6 Electrode melts or oxidises when an arc is struck.  | A Torch lead connected to positive welding terminal.<br>B No gas flowing to welding region.<br>C Torch is clogged with dust or dirt.<br>D Gas hose is cut.<br>E Gas passage contains impurities.<br>F Gas regulator turned off.<br>G The electrode is too small for the welding current. | A Connect torch lead to negative welding terminal.<br>B Check the gas lines for kinks or breaks and gas cylinder contents.<br>C Clean torch.<br>D Replace gas hose.<br>E Disconnect gas hose from the rear of Power Source then raise gas pressure and blow out impurities.<br>F Turn on.<br>G Increase electrode diameter or reduce the welding current. |

|                                     |  |   |
|-------------------------------------|--|---|
| 7 Dirty weld pool                   | <p>A Electrode contaminated by contact with work piece or filler rod material.</p> <p>B Work piece surface has foreign material on it.</p> <p>C Gas contaminated with air.</p>   | <p>A Clean the electrode by grinding off the contaminates.</p> <p>B Clean surface.</p> <p>C Check gas lines for cuts and loose fitting or change gas cylinder.</p>  |
| 8 Poor weld finish                  | Inadequate shielding gas.  | Increase gas flow or check gas line for gas flow problems.  |
| 9 Arc start is not smooth.          | <p>A Tungsten electrode is too large for the welding current.</p> <p>B The wrong electrode is being used for the welding job.</p> <p>C Gas flow rate is too high.</p> <p>D Incorrect shielding gas is being used.</p> <p>E Poor work clamp connection to work piece.</p> | <p>A Select the right size tungsten electrode. Refer to Table 4-3 Cigweld Tungsten Electrode Selection Chart.</p> <p>B Select the right size tungsten electrode type. Refer to Table 4-5 Cigweld Tungsten Electrode Selection Chart.</p> <p>C Select the right shielding gas flow rate for the welding job. Refer to Table 4-7.</p> <p>D Select the right shielding gas.</p> <p>E Improve connection to work piece.</p> |
| 10 Arc flutters during TIG welding. | Tungsten electrode is too large for the welding current.   | Select the right size tungsten electrode. Refer to Table 4-3 Cigweld Tungsten Electrode Selection Chart.  |

Table 4-8: GTAW (TIG) Welding Problems



## SECTION 5: POWER SOURCE PROBLEMS AND ROUTINE SERVICE REQUIREMENTS

### 5.01 Power Source Problems

| FAULT  | CAUSE  | REMEDY   |
|--|--|--|
| 1 Mains supply voltage is ON, Amps Display is illuminated however unit will not commence welding when the torch trigger switch is depressed. | A Power source is not in the correct mode of operation.<br>B Faulty torch trigger.   | A Set the power source to the correct mode of operation with the process selection switch.<br>B Repair or replace torch trigger switch/lead.   |
| 2 Fault Indicator is illuminated and unit will not commence welding when the torch trigger switch is depressed.                              | Duty cycle of power source has been exceeded.  | Leave the power source switched ON and allow it to cool. Note that fault indicator must be extinguished prior to commencement of welding.  |
| 3 Welding arc cannot be established.   | A Poor or no work lead contact.<br>B Trigger switch faulty or disconnected.  | A Clean work clamp area and ensure good electrical contact.<br>B Connect or repair trigger switch.   |
| 4 No gas flow in TIG mode.   | A Gas hose is damaged.<br>B Gas passage contains impurities.<br>C Gas regulator turned off.<br>D Empty gas cylinder.   | A Replace or repair.<br>B Disconnect gas hose from the rear of power source or wirefeeder and blow out impurities.<br>C Turn on regulator.<br>D Replace gas cylinder.  |
| 5 Gas flow continues after the torch trigger switch has been released (TIG mode).  | A Gas valve has jammed open due to impurities in the gas or the gas line.<br>B Post flow is active in TIG modes.   | A Have an accredited CIGWELD service provider repair or replace gas valve.<br>B Reduce post flow time  |
| 6 Amps Display will not illuminate and welding arc cannot be established.  | The mains supply voltage has exceeded voltage limits of the power source.  | Ensure that the mains supply voltage is within 240VAC $\pm$ 15%.   |
| 7 TIG electrode melts when arc is struck.  | TIG torch is connected to the (+) VE terminal.   | Connect the TIG torch to the (-) VE terminal.  |
| 8 Arc flutters during TIG welding.   | Tungsten electrode is too large for the welding current.   | Select the correct size of tungsten electrode. Refer to Table 4-3.   |
| 9 Fault light is on ,and E-1 is shown on the Amps display  | A Fail to Safe protection has operated in STICK mode- VRD fault.<br>B Fail to safe protection has operated in TIG mode- Inverter fault.<br>C External voltage has been applied to the welding circuit. | A Reset mains power, if fault does not clear then replace control board.<br>B Reset mains power, if fault does not clear then replace control board.<br>C Reset mains power and remove the source of the external voltage. |

|   |   |   |
|---|---|---|
| 10 Fault light is on, and E-1 is shown on the Amps display. | A Fail to Safe protection has operated in STICK mode- VRD fault.    | A Reset mains power, if fault does not clear then have an accredited CIG-WELD service provider repair unit. |
|   | B Fail to safe protection has operated in TIG mode- Inverter fault. | B Reset mains power, if fault does not clear then have an accredited CIG-WELD service provider repair unit. |
|   | C External voltage has been applied to the welding circuit          | C Reset mains power and remove the source of the external voltage   |

Table 5-1

## 5.02 Routine Service and Calibration Requirements



### WARNING

*There are extremely dangerous voltage and power levels present inside this Inverter Power Source. Do not attempt to open or repair unless you are an accredited CIGWELD Service Provider. Disconnect the Welding Power Source from the Mains Supply Voltage before disassembling.*

### Routine Inspection, Testing & Maintenance

The inspection and testing of the power source and associated accessories shall be carried out in accordance with Section 5 of AS 1674.2 - 2007: Safety in Welding and Allied Processes-Part 2 Electrical. This includes an insulation resistance test and an earthing test to ensure the integrity of the unit is compliant with Cigweld's original specifications.

If equipment is to be used in a hazardous location or environments with a high risk of electrocution as outlined in AS 1674.2 - 2007, then the above tests should be carried out prior to entering this location.

#### A. Testing Schedule

1. For transportable equipment, at least once every 3 months; and
2. For fixed equipment, at least once every 12 months.

The owners of the equipment shall keep a suitable record of the periodic tests and a system of tagging, including the date of the most recent inspection.

A transportable power source is deemed to be any equipment that is not permanently connected and fixed in the position in which it is operated.

#### B. Insulation Resistance

Minimum insulation resistance for in-service Cigweld Inverter Power Sources shall be measured at a voltage of 500V between the parts referred to in Table 6-1 below. Power sources that do not meet the insulation resistance requirements set out below shall be withdrawn from service and not returned until repairs have been performed such that the requirements outlined below are met.



| Components to be Tested   | Minimum Insulation Resistance (M $\Omega$ ) |
|---|---|
| Input circuit (including any connected control circuits) to welding circuit (including any connected control circuits)                          | 5   |
| All circuits to exposed conductive parts  | 2.5   |
| Welding circuit (including any connected control circuits) to any auxiliary circuit which operates at a voltage exceeding extra low voltage     | 10  |
| Welding circuit (including any connected control circuits) to any auxiliary circuit which operates at a voltage not exceeding extra low voltage | 1   |
| Separate welding circuit to separate welding circuit  | 1   |

Table 5-2: Minimum Insulation Resistance Requirements: Cigweld Inverter Power Sources

### C. Earthing

The resistance shall not exceed 1 $\Omega$  between any metal of a power source where such metal is required to be earthed, and -

1. The earth terminal of a fixed power source; or
2. The earth terminal of the associated plug of a transportable power source

Note that due to the dangers of stray output currents damaging fixed wiring, the integrity of fixed wiring supplying Cigweld welding power sources should be inspected by a licensed electrical worker in accordance with the requirements below -

1. For outlets/wiring and associated accessories supplying transportable equipment - at least once every 3 months; and
2. For outlets/wiring and associated accessories supplying fixed equipment - at least once every 12 months.

### D. Voltage Reduction Device (VRD)

Units fitted with VRD's, shall have the periodic tests outlined in Table 6-2 below conducted by an accredited CIGWELD service provider. Testing shall be conducted at intervals as outlined below -

1. For transportable equipment, at least once every 3 months; and
2. For fixed equipment, at least once every 12 months.

| Description              | Required Parameters                     |
|--------------------------|---|
| VRD Open Circuit Voltage | Less than 35V; at nominal input voltage |
| VRD Turn OFF Resistance  | Less than 200 ohms                      |
| VRD Turn ON Time         | Less than 0.3 seconds                   |

Table 5-3: VRD Periodic Tests

### E. General Maintenance Checks

Welding equipment should be regularly checked by an accredited Cigweld Service Provider to ensure that:

1. Flexible cord is of the multi-core tough rubber or plastic sheathed type of adequate rating, correctly connected and in good condition.
2. Welding terminals are in suitable condition and are shrouded to prevent inadvertent contact or short circuit.
3. The Welding System is clean internally, especially from metal filing, slag, and loose material.

**F. Accessories**

Accessory equipment, including output leads, electrode holders, torches, wire feeders and the like shall be inspected at least monthly by a competent person to ensure that the equipment is in a safe and serviceable condition. All unsafe accessories shall not be used.

**G. Repairs**

If any parts are damaged for any reason, it is recommended that replacement be performed by an accredited Cigweld Service Provider.

**Power Source Calibration**

**A. Schedule**

Output testing of all Cigweld Inverter Power Sources and applicable accessories shall be conducted at regular intervals to ensure they fall within specified levels. Calibration intervals shall be as outlined below -

- 1. For transportable equipment, at least once every 3 months; and
- 2. For fixed equipment, at least once every 12 months.

If equipment is to be used in a hazardous location or environments with a high risk of electrocution as outlined in AS 1674.2 - 2007, then the above tests should be carried out prior to entering this location.

**B. Calibration Requirements**

Where applicable, the tests outlined in Table 6-3 below shall be conducted by an accredited CIGWELD service agent.

| Testing Requirements  |
|---|
| Output current (A) to be checked to ensure it falls within applicable Cigweld power source specifications         |
| Output Voltage (V) to be checked to ensure it falls within applicable Cigweld power source specifications         |
| Accuracy of digital meters to be checked to ensure it falls within applicable Cigweld power source specifications |

Table 5-4: Calibration Parameters

Periodic calibration of other parameters such as timing functions are not required unless a specific fault has been identified.

**C. Calibration Equipment**

All equipment used for Power Source calibration shall be in proper working condition and be suitable for conducting the measurement in question. Only test equipment with valid calibration certificates (NATA certified laboratories) shall be utilized.

## 5.03 Cleaning the Welding Power Source



### WARNING

*There are dangerous voltage and power levels present inside this product. Do not attempt to open or repair unless you are a qualified electrical tradesperson. Disconnect the Welding Power Source from the Mains Supply Voltage before disassembling.*

To clean the Welding Power Source, open the enclosure and use a vacuum cleaner to remove any accumulated dirt, metal filings, slag and loose material.

## 5.04 Factory Reset Procedure

To perform a Factory Reset, press the Trigger Mode Button while turning on the mains power.

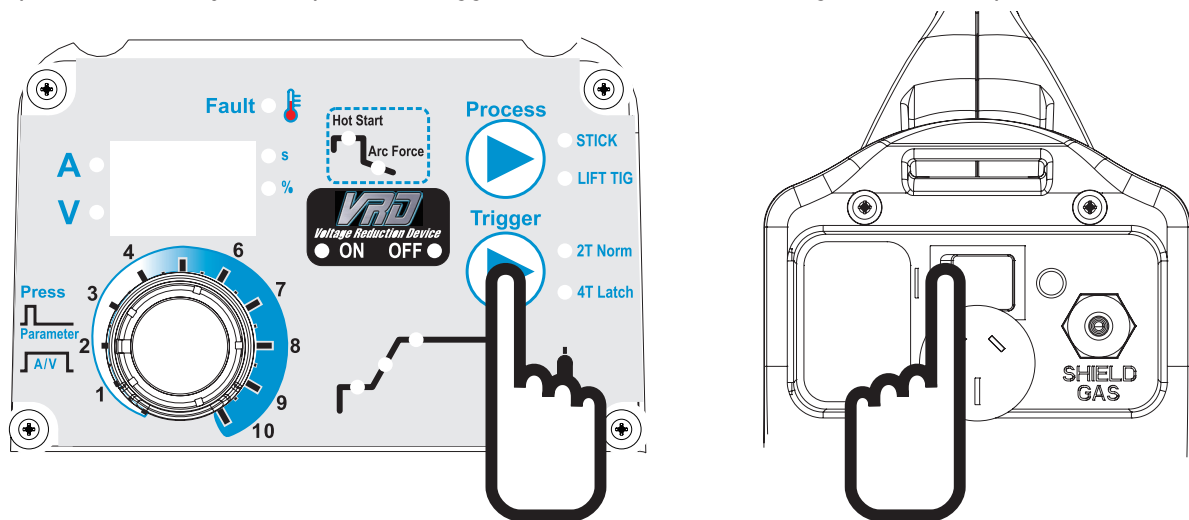


Figure 5-1



## SECTION 6: KEY SPARE PARTS

### 6.01 Power Source

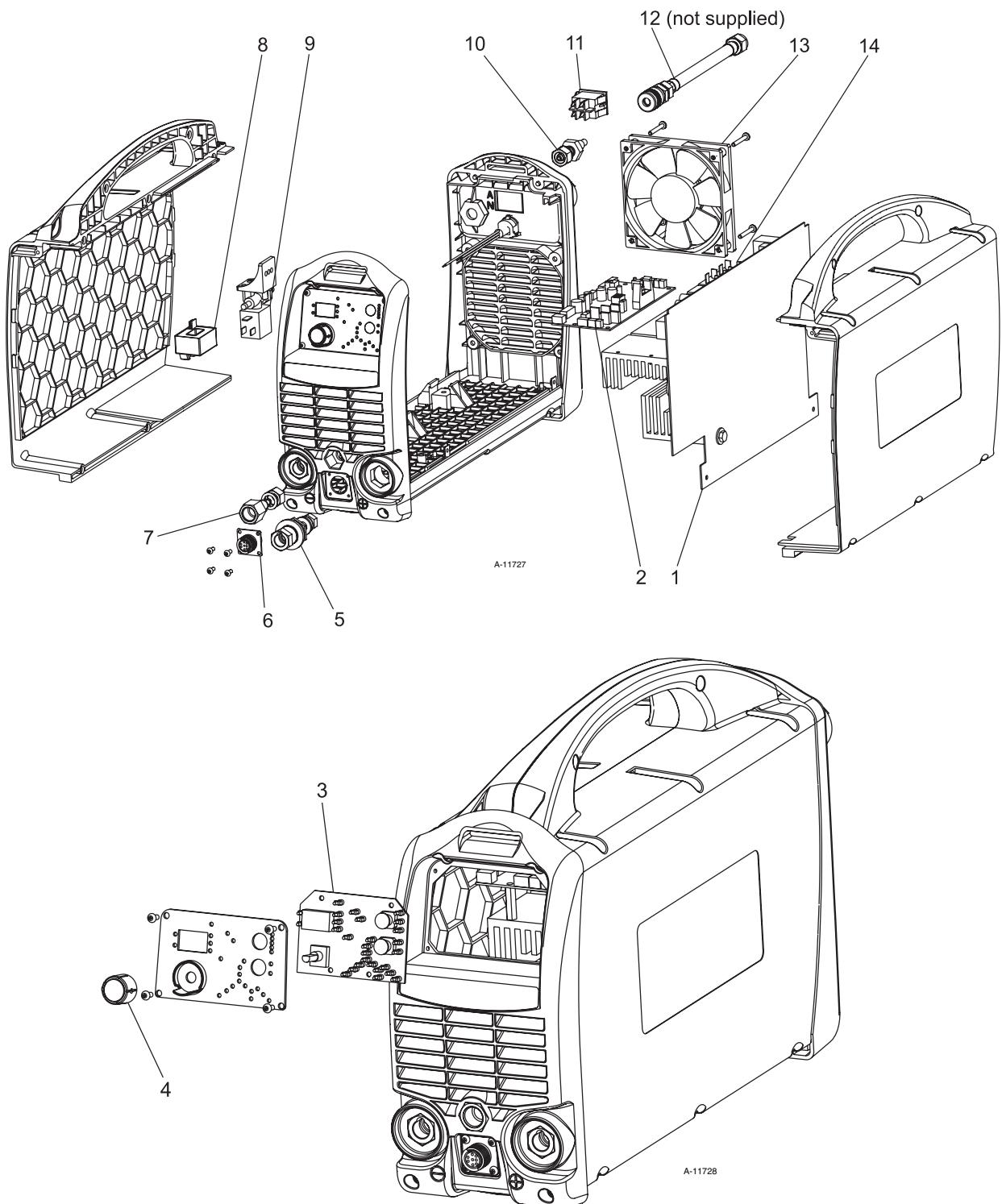


Figure 6-1

TRANSARC 170i

| TRANSARC 170i POWER SOURCE SPARE PARTS |             |  |
|--|-------------|--|
| ITEM                                   | PART NUMBER | DESCRIPTION  |
| 1                                      | W7005800    | PCB Power  |
| 2                                      | W7005801    | PCB Control  |
| 3                                      | W7005803    | PCB Front Panel (Display) 170i   |
| 4                                      | W7005805    | Knob Control   |
| 5                                      | W7004909    | Dinse Socket 50mm <sup>2</sup>   |
| 6                                      | W7005811    | Control Socket 8 pin (Note that 8 pin control plug is part number UOA706900) |
| 7                                      | W7005812    | Shielding Gas Outlet 5/8-18  |
| 8                                      | W7005814    | CT Output  |
| 9                                      | W7004908    | Shielding Gas Solenoid Valve Assembly  |
| 10                                     | W7005605    | Shielding Gas Inlet Quick Connect  |
| 11                                     | W7005813    | Input Supply On/Off Switch   |
| 12                                     | W7004913    | Shielding Gas Hose Assembly (not supplied)                                   |
| 13                                     | W7005806    | Fan Assembly   |
| 14                                     | W7003010    | Input Rectifier (Shown mounted to PCB Power, item 1)                         |
| 15                                     | 704461      | Dinse Plug Male 50mm <sup>2</sup> (not shown)                                |

Table 6-1

6.02 TIG Torch W4014604 (where supplied)

TIG Torch W4014604 spare parts diagram

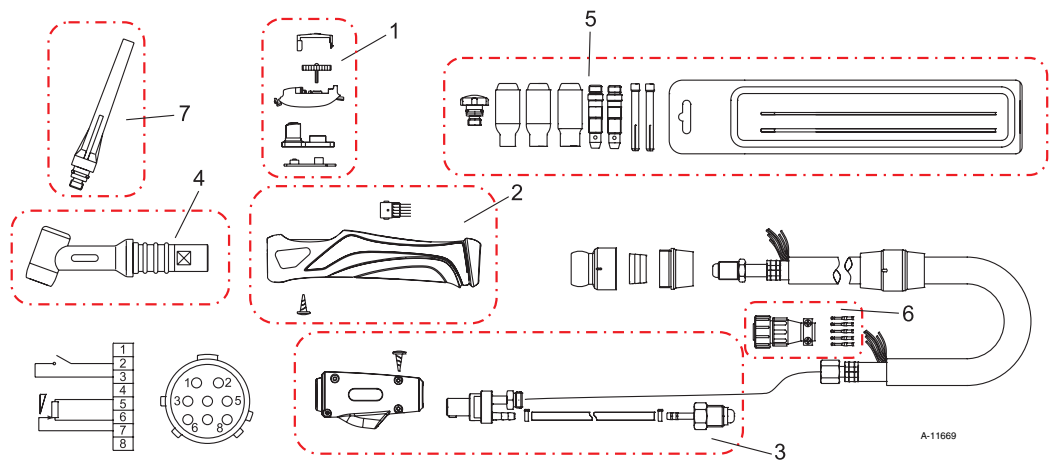


Figure 6-2

| TIG TORCH SPARE PARTS |           |                                |
|-----------------------|-----------|--------------------------------|
| ITEM                  | PART NO.  | DESCRIPTION                    |
| 1                     | W7005900  | Trigger assembly for 26F torch |
| 2                     | W7005901  | Handle assembly for 26F torch  |
| 3                     | W7005902  | Dinse 50mm for 26F torch       |
| 4                     | W7005903  | Flex head for 26F torch        |
| 5                     | BGSAK2    | Tig accessory Kit              |
| 6                     | UOA706900 | Cable Plug 8 pin               |
| 7                     | BG57Y02/R | Back Cap (Long)                |

Table 6-2

## 6.03 Stick Electrode Holder with Trigger Switch 646761(where supplied)

### Stick Electrode Holder with Trigger Switch 646761 spare parts diagram

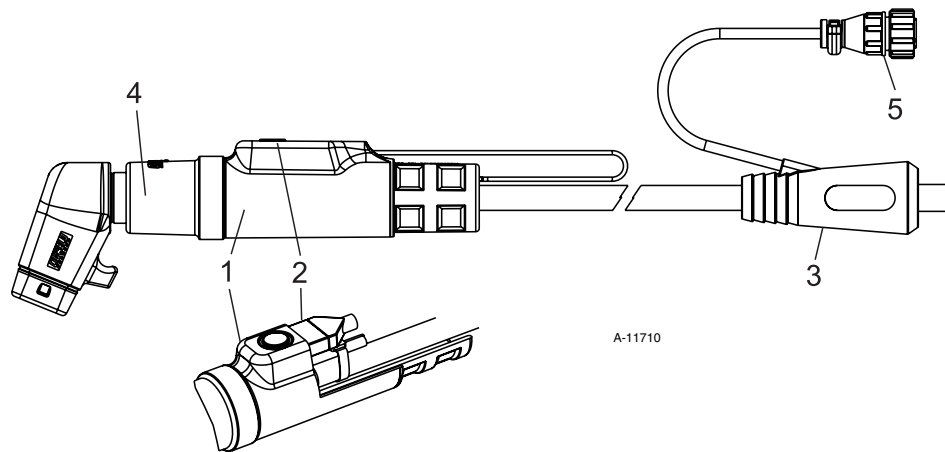


Figure 6-3

| ELECTRODE HOLDER SPARE PARTS |           |  |
|------------------------------|-----------|--|
| ITEM                         | PART NO.  | DESCRIPTION                                  |
| 1                            | W7006000  | Rubber boot for electrode holder switch      |
| 2                            | W7006001  | Push Button Switch for electrode holder      |
| 3                            | W7006002  | Dinse 50mm <sup>2</sup> for electrode holder |
| 4                            | 646162    | 400A electrode holder handle assembly        |
| 5                            | UOA706900 | Cable Plug 8 pin                             |

Table 6-3

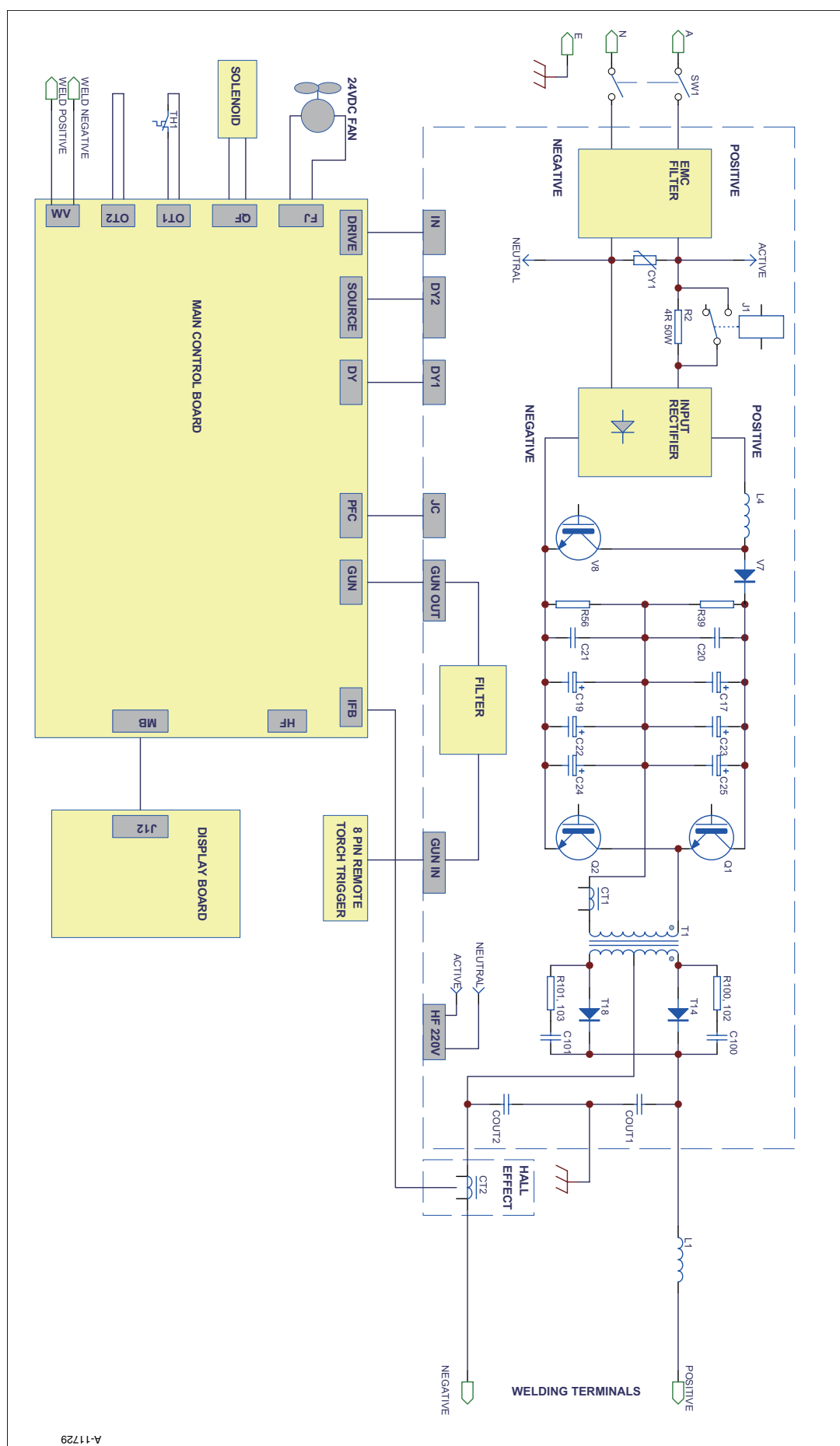
#### **Note**

*The Welding cable with integrated control wires is not available as a separate spare part.*





# APPENDIX: TRANSARC 170i CIRCUIT DIAGRAM





## **CIGWELD - LIMITED WARRANTY TERMS**

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LIMITED WARRANTY: CIGWELD Pty Ltd, A Victor Technologies Company, hereafter, "CIGWELD" warrants to customers of its authorized distributors hereafter "Purchaser" that its products will be free of defects in workmanship or material. Should any failure to conform to this warranty appear within the time period applicable to the CIGWELD products as stated below, CIGWELD shall, upon notification thereof and substantiation that the product has been stored, installed, operated, and maintained in accordance with CIGWELD's specifications, instructions, recommendations and recognized standard industry practice, and not subject to misuse, repair, neglect, alteration, or accident, correct such defects by suitable repair or replacement, at CIGWELD's sole option, of any components or parts of the product determined by CIGWELD to be defective.

CIGWELD MAKES NO OTHER WARRANTY, EXPRESS OR IMPLIED. THIS WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHERS, INCLUDING, BUT NOT LIMITED TO ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE.

LIMITATION OF LIABILITY: CIGWELD SHALL NOT UNDER ANY CIRCUMSTANCES BE LIABLE FOR SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES, SUCH AS, BUT NOT LIMITED TO, LOST PROFITS AND BUSINESS INTERRUPTION. The remedies of the Purchaser set forth herein are exclusive and the liability of CIGWELD with respect to any contract, or anything done in connection therewith such as the performance or breach thereof, or from the manufacture, sale, delivery, resale, or use of any goods covered by or furnished by CIGWELD whether arising out of contract, negligence, strict tort, or under any warranty, or otherwise, shall not, except as expressly provided herein, exceed the price of the goods upon which such liability is based. No employee, agent, or representative of CIGWELD is authorized to change this warranty in any way or grant any other warranty.

PURCHASER'S RIGHTS UNDER THIS WARRANTY ARE VOID IF REPLACEMENT PARTS OR ACCESSORIES ARE USED WHICH IN CIGWELD'S SOLE JUDGEMENT MAY IMPAIR THE SAFETY OR PERFORMANCE OF ANY CIGWELD PRODUCT. PURCHASER'S RIGHTS UNDER THIS WARRANTY ARE VOID IF THE PRODUCT IS SOLD TO PURCHASER BY NON-AUTHORIZED PERSONS.

The warranty is effective for the time stated below beginning on the date that the authorized distributor delivers the products to the Purchaser. Notwithstanding the foregoing, in no event shall the warranty period extend more than the time stated plus one year from the date CIGWELD delivered the product to the authorized distributor.

## TERMS OF WARRANTY – JANUARY 2013

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1. The Trade Practices Act 1974 (Commonwealth) and similar State Territory legislation relating to the supply of goods and services, protects consumers' interests by ensuring that consumers are entitled in certain situations to the benefit of various conditions, warranties, guarantees, rights and remedies (including warranties as to merchantability and fitness for purpose) associated with the supply of goods and services. A consumer should seek legal advice as to the nature and extent of these protected interests. In some circumstances, the supplier of goods and services may legally stipulate that the said conditions, warranties, guarantees, rights and remedies are limited or entirely excluded. The warranties set out in Clause 2 shall be additional to any nonexcludable warranties to which the Customer may be entitled pursuant to any statute.

2. Subject to Clause 3. CIGWELD gives the following warranties to the Customer:

Insofar as they are manufactured or imported by CIGWELD, goods will upon delivery be of merchantable quality and reasonably fit for the purpose for which they are supplied by CIGWELD.

CIGWELD will repair or, at its option, replace those of the goods which, upon examination, are found by CIGWELD to be defective in workmanship and/or materials.

CIGWELD reserves the right to request documented evidence of date of purchase.

3. The Warranty in Clause 2;

Is conditional upon:

The Customer notifying CIGWELD or our Accredited Distributor in writing of its claim within seven (7) days of becoming aware of the basis thereof, and at its own expense returning the goods which are the subject of the claim to CIGWELD or nominated Accredited Distributor/Accredited Service Provider. The goods being used in accordance with the Manufacturer's Operating Manuals, and under competent supervision.

Does not apply to:

Obsolete goods sold at auction, second-hand goods and prototype goods.

Breakdown or malfunction caused by accident, misuse or normal wear and tear.

Repairs or replacement made other than by CIGWELD or Accredited Service Providers, unless by prior arrangement with CIGWELD.

Replacement parts or accessories which may affect product safety or performance and which are not manufactured, distributed or approved by CIGWELD.

4. CIGWELD declares that, to the extent permitted by law, it hereby limits its liability in respect of the supply of goods which are not of a kind ordinarily acquired for personal, domestic or household use or consumption to any one or more of the following (the choice of which shall be at the option of CIGWELD).

The replacement of the goods or the supply of equivalent goods.

The repair of goods.

The payment of cost of replacing the goods or acquiring equivalent goods.

The payment of the cost of having goods repaired.

5. Except as provided in Clauses 2 to 4 above, to the extent permitted by statute, CIGWELD hereby excludes all liability for any loss, damage, death or injury of any kind whatsoever occasioned to the Customer in respect of the supply of goods including direct, indirect, consequential or incidental loss, damage or injury of any kind.

## WARRANTY SCHEDULE – JANUARY 2013

These warranty periods relate to the warranty conditions in clause 2. All warranty periods are from date of sale from the Accredited Distributor of the equipment. Notwithstanding the foregoing, in no event shall the warranty period extend more than the time stated plus one year from the date CIGWELD delivered the product to the Accredited Distributor. Unless otherwise stated the warranty period includes parts and labour. CIGWELD reserves the right to request documented evidence of date of purchase.

| TRANSARC 170i POWER SOURCE  | WARRANTY PERIOD |        |
|---|-----------------|--------|
|   | PARTS           | LABOUR |
| Original main power magnetics.  | 3 Year          | 2 Year |
| Original main power rectifiers, printed circuit boards and power switch semiconductors.   | 2 Year          | 2 Year |
| All other circuits and components including, but not limited to, relays, switches, contactors, solenoids, fans and electric motors. | 1 Year          | 1 Year |
| ACCESSORIES   | WARRANTY PERIOD |        |
| TIG torch, electrode holder lead and work lead.   | 3 Months        |        |
| TIG torch consumable items.   | NIL             |        |
| Gas regulator/flowmeter (excluding seat assembly, pressure gauges, elastomer seals and "O" rings).                                  | 1 Year          |        |
| Regulator seat assemblies and pressure gauges.  | 6 Months        |        |
| Elastomer seals and "O" rings used in the equipment.  | 3 Months        |        |

Please note that the information detailed in this statement supersedes any prior published data produced by CIGWELD.

## Australia Terms of Warranty – 2013

Effective 1st January 2012, all warranties against defects (also known as a manufacturer's warranty) supplied with goods or services must comply with the new Australian consumer law regulations (2010).

This Warranty Statement should be read in conjunction with the Warranty Schedule contained in the operating instructions of the product. This schedule contains the warranty period applicable to the product

Any claim under this warranty must be made within the warranty period which commences on the date of purchase of the product. To make a claim under the warranty, take the product (with proof of purchase from a Cigweld Accredited Seller) to the store where you purchased the product or contact Cigweld Customer Care 1300 654 674 for advice on your nearest Service Provider.

All costs associated with lodging the warranty claim including the return of goods to Cigweld or our Nominated Accredited Distributor/Accredited Service Provider are the responsibility of the consumer.

This warranty is given.  
Cigweld Pty Ltd  
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Victoria, Australia, 3072  
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Email: [enquiries@cigweld.com.au](mailto:enquiries@cigweld.com.au)  
Website: [www.cigweld.com.au](http://www.cigweld.com.au)

This warranty is provided in addition to other rights and remedies you have under law: Our goods come with guarantees which cannot be excluded under the Australian Consumer Law. You are entitled to replacement or refund for a major failure and to compensation for other reasonably foreseeable loss or damage. You are also entitled to have the goods repaired or replaced if the goods fail to be of acceptable quality and the failure does not amount to a major failure.

Failures due to incorrect use are not covered by this warranty and consumers are reminded to only use the product in accordance with the Operating Instruction supplied with the product. Additional copies of Operating Instructions are available from Cigweld Customer Care 1300 654 674 or the Website.



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***CIGWELD***